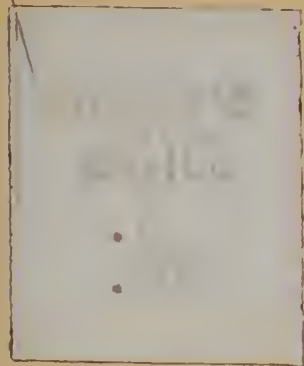


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**USDA PROCEDURES  
FOR PLANNING  
WATER AND RELATED LAND RESOURCES  
IN PROGRAMS ADMINISTERED BY THE  
SOIL CONSERVATION SERVICE**

**PREPARED BY  
UNITED STATES DEPARTMENT OF AGRICULTURE**

**ECONOMIC RESEARCH SERVICE  
FOREST SERVICE  
SOIL CONSERVATION SERVICE**

**MARCH 1974**

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## PREFACE

Principles and Standards for Planning Water and Related Land Resources were published by the Water Resources Council on September 10, 1973, in the Federal Register, Volume 38, Number 174, Part III, and became effective on October 25, 1973. These Principles and Standards apply to federal agencies whose activities involve planning and development of water resources. The Standards direct heads of the agencies involved to prepare procedures which, following review for consistency by the Water Resources Council, will direct agency planning activities. This document contains the USDA Procedures.

These Procedures state how USDA agencies will implement the conceptual basis embodied in the Principles and Standards in planning water and related land projects and river basin activities of the Soil Conservation Service. The programs to which these Procedures apply are the Watershed Program, Resource Conservation and Development Program, the eleven watersheds authorized by PL 78-534, and those river basin studies conducted cooperatively with the states and other federal agencies.

Experience in the application of these Procedures will provide a basis for additional guidance on plan formulation, evaluation and the display of plan effects. These Procedures are subject to periodic revision and will be supplemented with instructions specific to each program administered by the Soil Conservation Service. This will assist planning personnel in their uniform application.

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# CHAPTER I - PURPOSE AND SCOPE

Since May 1962, the foundation document for formulating and evaluating water and related land resource plans has been Senate Document 97. In the period since 1962, national interests and priorities have changed. It is in response to this changing emphasis towards water and land resources that the Water Resources Council and its member agencies direct the Principles and Standards for Water and Related Land Resources Planning. These Principles and Standards were published on September 10, 1973, in the Federal Register, Volume 38, Number 174, Part III and became effective on October 25, 1973.

The Principles provide the broad framework for planning activities and include the conceptual basis for planning.

The Standards provide for uniformity and consistency in comparing, measuring, and judging beneficial and adverse effects of alternative plans.

The Water Resources Council will publish Procedures for implementing the Principles and Standards. Until the WRC Procedures are available, these USDA Procedures for Water and Land Resources Planning, which have been reviewed by the Water Resources Council for consistency with the Principles and Standards, provide methods for carrying out the various levels of planning activities, including the selection of objectives, the formulation of alternative plans, the evaluation and measurement of beneficial and adverse effects, the comparison of alternative plans, and the selection of a recommended plan.

The intensity of the application of these Procedures will vary with the level of planning, benefits realized, and environmental characteristics of the planning area. Abbreviation or approximation will be necessary in smaller implementation studies in order to keep planning inputs commensurate with the scope and significance of the project being planned.

These Procedures apply to programs administered by the Soil Conservation Service. As such, they apply to watershed projects planned under Public Law 83-566, Resource Conservation and Development (RC&D) project measure plans planned under Public Laws 74-46 and 75-210, subwatershed projects in the eleven authorized flood prevention watersheds under Public Law 78-534, joint investigations and surveys under Public Law 87-639, and cooperative (Type 4) river basin studies under authority of Section 6 of Public Law 83-566.

For other comprehensive planning efforts -- framework studies and assessments and regional or river basin plans -- where USDA is a participating member, USDA will assist the lead agency in developing a standard set of procedures for the study or will utilize the procedures of the lead agency.

The Administrator of the Soil Conservation Service is responsible for applying the Standards to the water and land resource development programs through which the Service provides federal assistance. These Procedures will be followed in the planning process to adequately discharge this responsibility.

## CHAPTER II - OBJECTIVES

The Principles and Standards specify that the overall purpose of water and land resource planning will be directed toward improvement in the quality of life through contributions to the objectives of national economic development and environmental quality. These objectives provide for the use of water and land resources to meet foreseeable short- and long-term needs which have been explicitly stated or implied in numerous Congressional enactments and Executive actions. The objectives for water and land resource planning are defined as (1) national economic development and (2) environmental quality.

### NATIONAL ECONOMIC DEVELOPMENT

To enhance national economic development by increasing the value of the Nation's output of goods and services and improving national economic efficiency is one objective.

National economic development reflects increases in the Nation's productive output, an output which is partly reflected in a national product and income accounting framework designed to measure the continuing flow of goods and services into direct consumption or investment.

In addition, national economic development is affected by beneficial and adverse externalities stemming from normal economic production and consumption, imperfect market conditions, and changes in productivity of resource inputs due to investment.

National economic development as defined in these Procedures is only partially reflected in the gross national product and national income accounting framework.

Components of the national economic development objective include:

1. The value to the Nation of increased outputs of goods and services resulting from a project or plan. Development of water and land resources result in increased production of goods and services which can be measured in terms of their value to the user. Increased crop yields, expanding recreational use, and sufficient municipal and industrial water supply, are examples of direct increases in the Nation's output which result from water and land resources developments.



Moreover, such developments often result in a change in the productivity of natural resources and the productivity of labor and capital used with these resources. Increased earnings from changes in land use, reduced disruption of economic activity due to droughts, floods, and fluctuating water supply; reduced damage to committed resources; and removal of constraints on production through increased water supply are examples of direct increases in productivity from water and land development that contribute to national output. Development of water and land resources may result in increased production from the employment of otherwise unemployed or underemployed resources, as well as contributions to increased output due to cost savings resulting in the release of resources for employment elsewhere.

2. The value of output resulting from external economies. In addition to the value of goods and services derived by users of outputs of an implemented plan, there may be external gains to other individuals or groups.

Externalities resulting from project action are either technological or pecuniary. External economies are beneficial effects to individuals, groups, or industries which may or may not benefit from the direct output of the plan. They result if an increase in the output of final consumer goods or intermediate goods takes place beyond what would occur in the absence of the plan and over and above direct outputs of the plan.

Technological externalities involve changes in efficiency of production functions. Considerable confusion exists between technological externalities and utilization of unemployed or underemployed resources. Technological externalities exist only when efficiency gains occur to economically related firms through the use of new or improved technology made profitable by the direct output of the project. For example, a cotton gin with outmoded equipment may find it profitable with the increased output of cotton from the project to replace its equipment with new equipment and thereby reduce its average cost per unit of output. This gain would be a technological externality. In contrast would be a cotton gin operator who has capacity to gin more cotton with his present equipment. As the output of cotton increases with the project, the operator is able to use his underemployed capital resources more efficiently. These effects are classified as utilization of unemployed resources.

Where technological external effects can be identified as a result of project action, effects will be measured as increased profits to the firm. These will be computed as a reduced average cost per unit of output or as increased gross output times a profit coefficient representing the firm. In some cases, it is questionable if the value derived would warrant the time necessary to compute the effect.

Pecuniary externalities relate to changes in income of firms economically related to direct and indirect users of project output. These are "induced by" and "stemming from" effects. A caution in estimating pecuniary external economies concerns estimation of effects in absence of the project. If society would obtain the project output of final consumer goods or the output of firms who utilize the intermediate goods of the project from some other source in the absence of the project, then the net income of the related firms would be unaffected by the project and would not contribute to national economic development. All output required to meet existing or projected demand of an area gives rise to direct and indirect effects from a national viewpoint. Project output in excess of requirements (demand) would reflect trade-offs between regions and would not contribute to pecuniary external economies from a national viewpoint.

## ENVIRONMENTAL QUALITY

To enhance environmental quality by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems is another objective. This objective reflects society's concern and emphasis for the natural environment and its maintenance and enhancement as a source of present enjoyment and a heritage for future generations.

Recognition will be given to the desirability of diverting a portion of the Nation's resources from production of more conventional market-oriented goods and services in order to accomplish environmental objectives. As incomes and living levels increase, society appears less willing to accept environmental deterioration in exchange for additional goods and services in the market place.

The environmental objective reflects man's abiding concern with the quality of the natural physical-biological system in which all life is sustained.

Components of the environmental quality objective include:

1. Management, protection, enhancement, or creation of areas of natural beauty and human enjoyment such as open and green space, streams and river systems, lakes and reservoirs, beaches, shores, wetlands, mountain and wilderness areas, and estuaries;
2. Management, preservation, or enhancement of especially valuable or outstanding biological resources (including fish and wildlife habitat) and ecosystems;



3. Management, preservation, or enhancement of especially valuable or unique geological, archeological, and historical resources;

4. Enhancement of quality aspects of water, land, and air by control of pollution, prevention of erosion, and restoration of eroded areas in order to harmonize land use objectives in terms of productivity for economic use and development with conservation of the resources;

5. Avoiding irreversible or irretrievable commitments of resources. While all forms of development and use affect and sometimes change the tenuous balance of fragile aquatic and terrestrial ecosystems, the implication of all possible effects and changes on such systems is imperfectly understood at the present time. In the absence of absolute measures or standards for reliably predicting ecological change, these guidelines emphasize the need for a cautionary approach in meeting development and use objectives in order to minimize or preclude the possibility of undesirable and possible irreversible or irretrievable changes in the natural environment;

6. Others. Given its broad and pervasive nature, it is not practical to specifically identify in these Procedures all possible components of the environmental quality objective. If other components are recognized, they should be explicitly identified and accommodated in the planning process.

## EFFECTS ON OBJECTIVES

To achieve these explicit objectives in the planning of water and land resource developments, at least one alternative plan must be formulated to optimize national economic development and one plan to emphasize environmental quality. Within these two extreme points of a planning spectrum, other alternative plans are to be formulated reflecting various mixes of the components of the national economic development and environmental quality objectives, and reflecting significant physical, technological, legal or public policy constraints culminating in a recommended plan (see Chapter IV).

For each alternative plan formulated, there will be a display or accounting of relevant beneficial and adverse effects to the national economic development, environmental quality, regional development, and social well-being accounts.

The identification of effects will be in both monetary and non-monetary terms. Further, the accounts are not mutually exclusive with respect to beneficial or adverse effects. As such, a project action may accrue effects to more than one account.

Effects by objectives and accounts include both beneficial and adverse.

#### 1. Beneficial Effects on National Economic Development

Beneficial effects to be displayed in the national economic development account are increases in the value of the output of goods and services and improvements in national economic efficiency resulting from a plan. These include:

- a. The value to **users** of increased outputs of goods and services and
- b. The value of output resulting from external economies.

#### 2. Adverse Effects on National Economic Development

Adverse effects of a plan to be displayed in the national economic development account include:

- a. The value of resources required for or displaced by a plan and
- b. Losses in output resulting from external diseconomies.

#### 3. Beneficial and Adverse Effects on Environmental Quality

The effects of alternative plans on the environmental characteristics of the area under study or elsewhere in the Nation will be evaluated. Environmental effects will be displayed in terms of relevant physical and ecological criteria or dimensions, including the appropriate qualitative aspects. Such an evaluation will be displayed in the environmental quality account and include the effects of the project or plan on:

- a. Areas of natural beauty;
- b. Water, land, and air quality;
- c. Biological resources and selected ecosystems;
- d. Geological, archeological, and historical resources; and
- e. Irreversible or irretrievable commitments of resources to future uses.

#### 4. Beneficial and Adverse Effects on Regional Development

Beneficial and adverse effects relevant to the evaluation of alternative projects or plans upon the area or region under study will be measured and displayed in the regional



development account. Likewise, these effects will be displayed and appropriately accounted as they impact upon other regions and upon the rest of the Nation. These regional effects include:

a. Income effects

(1) Beneficial

(a) The value of increased output of goods and services accruing within relevant regions and

(b) The value of output resulting from external economies accruing within relevant regions.

(2) Adverse

(a) The value of resources within relevant regions required for or displaced by a plan.

(b) Losses in output resulting from external diseconomies within the relevant regions.

b. Beneficial and adverse effects on other components of regional development.

(1) The number and types of jobs resulting from a plan in the region under consideration;

(2) Effects on population distribution within the region under consideration and among regions in the Nation;

(3) The effect on the economic base and economic stability of the region under consideration;

(4) The effect on the environment in the region under consideration, and

(5) The effect on other specified components of regional development.

5. Beneficial and Adverse Effects on Social Well-Being

The effects of alternative plans to be displayed in the social well-being account include:

a. Real income distribution - The effects on the real income of classes or groups that are relevant to the evaluation of a project or plan will be displayed. All effects, both monetary and income in kind, will be included in this display.

b. Life, health and safety - Plan effects on life, health and safety other than those evaluated monetarily for the national economic development objective will be included here. Measurement techniques will vary but will usually be in terms of physical units.

c. Educational, cultural and recreational - The effect on educational, cultural and recreational opportunities.

d. Emergency preparedness - The effects on reserve capacities and flexibilities in water resource systems and protection against interruption of the flow of essential goods and services at times of national disaster or critical need will be displayed.

e. Other - Other effects on social well-being may be identified and displayed as relevant to alternative plans.



## CHAPTER III - GENERAL EVALUATION STANDARDS

The following general evaluation guides are to be used, to the extent applicable, in water and land resources planning. Significant deviations in the application of these evaluation standards and the reasons therefor should be fully reported and cleared with the Administrator prior to their use in an implementing document.

### PROJECTIONS

Plan formulation and evaluation will be referenced to national and regional projections of employment, output, and population and the amounts of goods and services that are likely to be demanded from or provided by the project. The Water Resources Council has arranged for preparation and periodic revision of one set of national, regional, and area economic projections as a guide to project, state, regional, and river basin planning. These projections represent the Council's current views as to probable rates of growth in population, the gross national product, employment, productivity and other factors. These projections include rates of regional growth consistent with the level of projected national growth.

Other projections may be used which are based on alternate assumptions of population and gross national product. Also future environmental conditions acceptable to the general public can be one constraint on alternative projections. When alternative projections are used in formulating plans for water and land resources, the relationship of these projections to the "baseline" projections must be clearly stated.

The Water Resources Council's national and regional projections will be used in all cooperative (Type 4) river basin and Public Law 87-639 surveys. Difficulties exist in further disaggregating regional data to areas the size of Public Law 83-566 watersheds and RC&D measure plans. Implementation studies, in areas where regional or river basin plans are not completed, or projections are not available, will use other more localized projections. Commodity outputs and land and water use with and without the project will, however, be related to regional projections to facilitate a national accounting system. Implementation studies within a completed regional or river basin plan, where projections are available, will utilize the projections and findings of the plan.



For cooperative (Type 4) river basin and Public Law 87-639 surveys other economic and demographic projections may also be used to more appropriately reflect the resource capabilities and potentials in the planning area than is possible in a national-interregional analysis and to reflect other views of the future. Such projections, however, should be made on a comparable basis with the WRC's projections to enable valid comparisons to be made between alternative plans based on these different projections. Any modification of the WRC's projections will be communicated through USDA to the WRC.

Projections of environmental requirements, other than clean air and water standards, have not been spelled out. However, it will be necessary to identify those specific features of the environment that will assure achievement of environmental surroundings which the general public considers acceptable. These environmental component needs should reflect not only current preferences but should attempt to reflect preferences likely to prevail in the future.

## WITH AND WITHOUT ANALYSIS

Starting with conditions that exist at present in the planning area, projections of the future without and with project conditions are made to evaluate beneficial and adverse effects that may accrue to the project or plan. A simple before and after comparison not recognizing potential changes over time is inappropriate. Land and water resource use and economic, social, and environmental conditions are not static and changes are likely to occur even without a project or plan. The primary function of a project or plan must be to alleviate undesirable conditions or satisfy a need that exists or will exist in the future without the projects or plans under consideration. Substantiation of the projected conditions will be based upon field surveys in the project and comparison areas. A summary of the specific economic setting for the study area should cover the condition and functional relationships of its various resources, their development potentials and possible conflicts, and the locational situation with respect to investment climate, markets, and basic economic productivity.

## RELATIONSHIP OF PROJECTIONS TO THE FUTURE WITHOUT CONDITIONS

Projections are conditional forecasts of the future. They are based upon stated assumptions about factors that are expected to impact on future conditions. Inherent in most economic projections are assumptions on population growth, level of employment, labor productivity, technology, food consumption patterns, and the absence of major military conflicts. Projections, therefore, can only be as valid as the assumption upon which they are based.

Projections reflect historical development and economic activity as modified by discernible trends determined by analysis of present and past relationships. If there are no changes in the objectives of the people, if limits of resource availability are not reached, if anticipated technology is attained, and if the influence of external forces remains constant, projections could reasonably be expected to chart the future.

Projections are subject to different orders of reliability. Projections for the near future are more reliable than those for distant time frames. Projections for small areas cannot be used with the same confidence level as those for areas of greater geographic aggregation. Likewise, projections for an industry cannot be expected to be as reliable as estimates of national output or income. Due to these limitations projections cannot be considered as planning goals or constraints. However, a need does exist in water resource planning for projections to assist in defining economic development objectives. They have been and are being developed by various sources. Projections are available in various regional reports, in state, county and city economic development plans, from utility companies, in the first national assessment of the Water Resources Council entitled "The Nation's Water Resources" and recently in the Water Resources Council's "1972 OBERS Projections." The OBERS projections were distributed by RB Advisory-3, dated February 16, 1973. In contrast to state, regional and most other projections, OBERS is a set of nationally consistent projections.

The basis for the formulation and evaluation of water and land resource developments is the determination of the effect(s) project action will have in modifying conditions that would exist over the evaluation period without the project both from a national and regional viewpoint. This requires an estimate of future outputs for goods and services and the supply of goods and services available to meet these outputs for specified time frames without project action. Projected outputs are the amounts of specific commodities that will be used to maintain a standard of living consistent with society's desires. Outputs which must be met with project action are component needs in the planning concept.

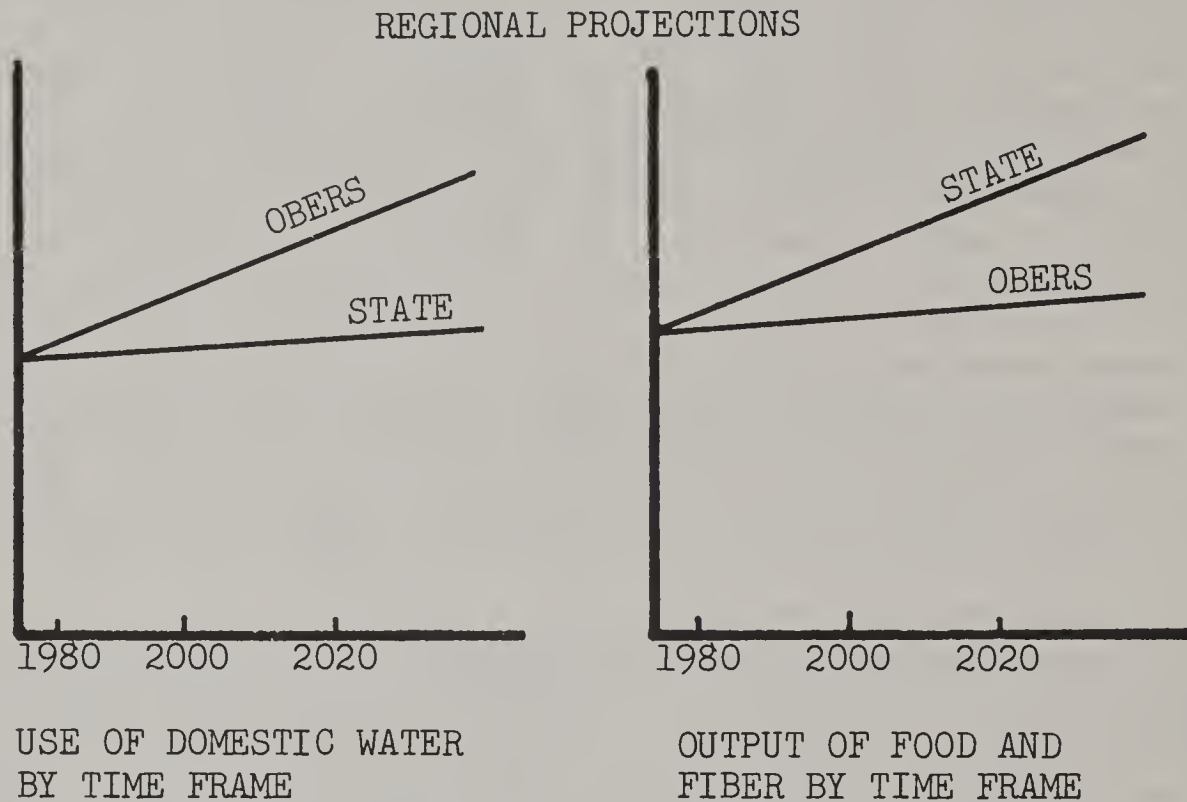
Projections indicate parameters for outputs of land and water resource developments over a specified planning period. The determination of the number and types of developments necessary for each time frame to satisfy current and projected uses can then follow.

Using projections, assessments of future uses of water and land resources can be made; i.e., municipal and industrial water supply, recreational developments, food and fiber, urban and rural land,



flood prevention, etc. Outputs based on OBERS projections provide a base for formulating a national economic development alternative. Regional projections for river basin studies provide a base for formulating alternative plans emphasizing regional preferences.

To illustrate using hypothetical data, assume (1) that regional desires for population growth would be less than that indicated by OBERS and (2) that regional desires for output of food and fiber would be commensurate with resources. These regional preferences are shown as they relate to OBERS projections for the region in the following graphic presentation:



Following the development of outputs and uses by categories by time frames, consideration is given to the ability of the area's land and water resources to meet them. A base for this consideration is an evaluation of the degree of goods and services that could be realized in the future by continuation of the present operation of existing projects, the construction and operation of presently authorized projects, a continuation of technology, and continuation of going (land treatment) programs (future without situation). From this evaluation and the projected outputs and uses in 1980, 2000, and 2020, the component needs of the future are illustrated. These component needs are the base for formulating alternative solutions from a national and regional viewpoint. For evaluation considerations, any increase in the value of the Nation's output

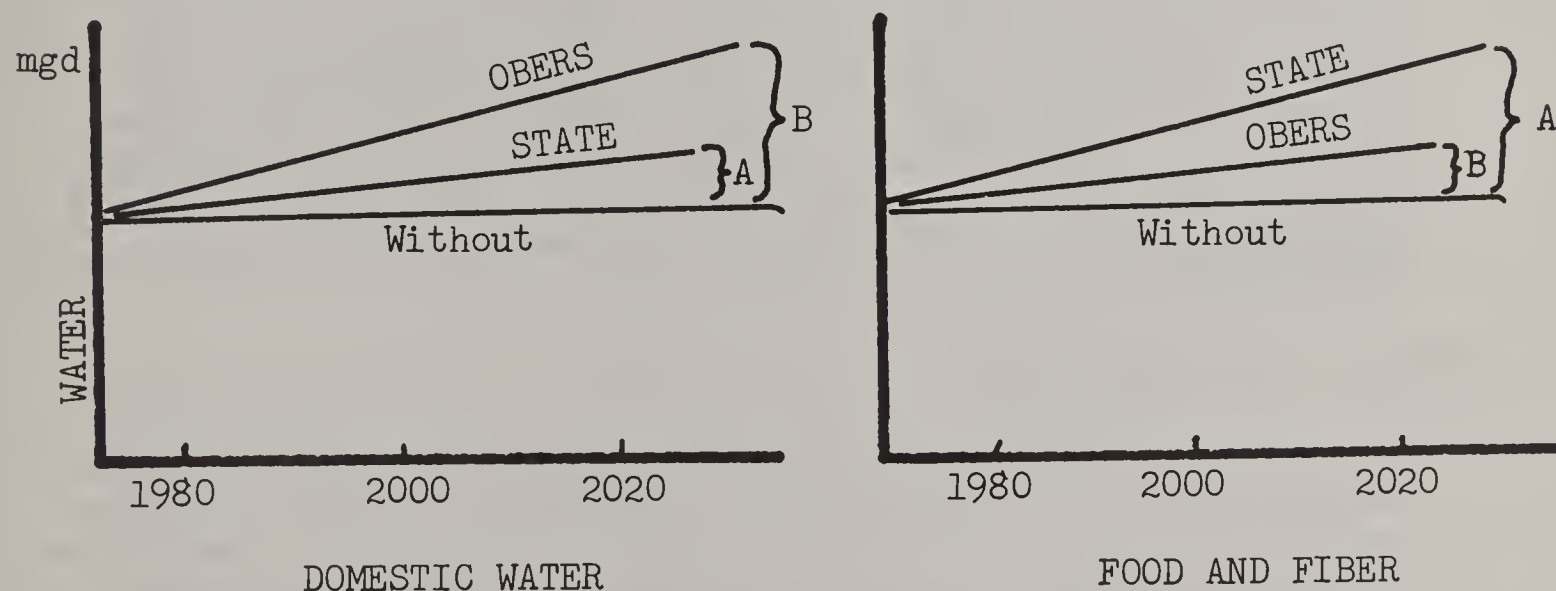


of goods and services to meet the component needs expressed by OBERS contributes to national economic development. Values of output in excess of OBERS projections would contribute to regional development and be reflected as transfers from other regions.

Caution must be exercised in projecting future outputs for the without situation. Basic to projections is the assumption that factors influencing historical trends will continue into the future. Thus, to extrapolate past trend lines which are based upon interrelationship of land and water resource projects, technology, and land treatment measures would overstate projected outputs for the without situation. Instead, it is necessary to reflect only improvements through technology and land treatment and accompanying changes in land and water use that can be reasonably expected to occur without future projects.

The validity of all assumptions inherent in the OBERS projections applicable to the study area should be examined and any necessary modifications reflected in the without project condition. The location of population growth centers relative to flood prone or prime irrigated areas is essential in the determination of goods and services that could be realized in the future without further projects and is an example of assumptions to be examined.

An example of the use of the without project condition for formulation and evaluation, using the domestic water and food and fiber examples used previously, can be shown graphically as follows:



From the point of view of the "state" the needs for development are defined by "A". With regard to "OBERS" the needs are defined as "B". In the case of domestic water the difference between A and B must be met in some other region. In the case of food and fiber the additional regional production would be at the expense of another region.

Also illustrated above is the need to reference all projections, from whatever source, to the OBERS baseline projection.

The major purpose of OBERS projections in watersheds, flood prevention subwatersheds, and RC&D measure plans is to provide a common reference whereby outputs of studies can be aggregated and compared to regional and national projections. For any study to provide input into this analytical system, it is necessary that the planned output be specified in units of commodity output and land and water use by time frames and referenced to the OBERS projections for that planning area.

For cooperative (Type 4) river basin and PL 87-369 surveys, there is need for regional and national projections of future population, employment, personal income, and earnings by selected industrial categories as well as projected outputs for food and fiber. One set of projections used should be the national baseline projections (OBERS). As stated in OBERS Volume 1: "These baseline projections are the best estimate of what can be expected to materialize if there are no policy or program changes of an unusual or unforeseen nature or magnitude in the factors which have been changing over time and which are expected to continue on course in the future. Of course, identifiable, long-term secular trends are implicitly incorporated into the projections." They reflect historical regional growth patterns and probable future population and economic conditions for all regions of the Nation. Additional projections, which reflect regional preferences for population growth, environmental issues, and economic development, should be developed and used to provide important basic data for planning a range of alternative futures.

## PRICE RELATIONSHIPS

The price of goods and services used for evaluation should reflect the real exchange values expected to prevail over the period of analysis. For this purpose, relative price relationships and the general level of prices for outputs and inputs prevailing during or immediately preceding the period of

planning generally will be used as representing the price relationships expected over the life of the plan. These price relationships will be used for estimating construction costs, operation and maintenance costs, and for estimating damages and benefits to other than agricultural crops.

The Water Resources Council will periodically publish data on prices of agricultural and other goods and services for all planning activities. Included in these publications may be special analyses of price problems and simulated prices for recreation and other project outputs or effects for which market prices are not readily available. Adjustments in the current normalized prices may be necessary to reflect intrastate relationships.

Current simulated prices per recreation day. A single unit value will be assigned per recreation day regardless of whether the user engages in one activity or several. The unit value, however, may reflect both the quality of activity and the degree to which opportunities to engage in a number of activities are provided.

Two classes of outdoor recreation days, general and specialized, are differentiated for evaluation purposes. Estimates of total recreation days of use for both categories, when applicable, will be developed.

<u>Type of Outdoor Recreation Day</u>	<u>Range of Unit Day Values</u>
General.....	\$0.75-\$2.25
(A recreation day involving primarily those activities attractive to the majority of outdoor recreationists and which generally require the development and maintenance of convenient access and adequate facilities.)	
Specialized.....	\$3.00-\$9.00
(A recreation day involving primarily those activities for which opportunities, in general, are limited, intensity of use is low, and often may involve a large personal expense by the user.)	

The general class, constituting the great majority of all recreation activities associated with water projects, embraces the



more usual activities, such as swimming, picnicking, boating, and most warm water fishing. The special class generally includes activities less often associated with water projects, such as big game hunting and fishing for certain migratory species.

In view of the fewer alternatives available and the likelihood that higher total costs are generally incurred by those engaged in hunting and fishing activities compared with those engaged in other types of outdoor recreation, it may be anticipated that the monetary unit values applicable to fish and wildlife recreation will ordinarily be larger than those applied to other types of recreation. Some watershed and RC&D recreational developments which are located in unique physical settings and provide for a limited number of participants at any one time may also be considered in the specialized class.

## DISCOUNT RATE

The interest rate to be used in plan formulation and evaluation for discounting future benefits and computing costs, or otherwise converting benefits and costs to a common time basis, shall be based upon the average yield during the preceding fiscal year on interest-bearing marketable securities of the United States which, at the time the computation is made, have terms of 15 years or more remaining to maturity: Provided, however, that in no event shall the rate be raised or lowered more than one-quarter of one percent for any year. The average yield shall be computed as the average during the fiscal year of the daily bid prices. Where the average rate so computed is not a multiple of one-eighth of 1 percent, the rate of interest shall be the multiple of one-eighth of 1 percent nearest to such average rate.

Where construction of a project has been authorized prior to the close of the second session of the 90th Congress, and the appropriate state or local governmental agency or agencies have given prior to December 31, 1969, satisfactory assurances to pay the required nonfederal share of project costs, the discount rate to be used in the computation of benefits and costs for such project shall be the rate in effect immediately prior to October 15, 1968 (3-1/4 percent), and this rate shall continue to be used for such project until construction has been completed, unless the Congress otherwise decides.

The Water Resources Council will announce, as of July 1, the discount rate to be used by all water resource planning agencies during the fiscal year. The discount rate to be used in plan formulation and evaluation during fiscal year 1974 is 5-5/8 percent.

## PERIOD OF ANALYSIS

The period of analysis will be the lesser of (1) the period of time over which the plan will serve a useful purpose considering probable technological trends affecting various alternatives; or (2) the period of time when further discounting of beneficial and adverse effects will have no appreciable result on design. Where pertinent, however, appropriate consideration will be given to long-term environmental factors which may extend beyond periods significant for analysis of effects for national or regional economic development.

One hundred years will normally be considered the upper limit of the period of analysis. Shorter periods will be used whenever appropriate.

## CONSIDERATION AND COMPARISON OF ALTERNATIVES

A full range of possible alternatives will be considered in the planning process to meet the specified study objectives relating to national economic development and environmental quality. Where applicable, alternatives capable of application by various levels of government and by nongovernmental interests should be studied.

## RELATIONSHIP OF BENEFICIAL AND ADVERSE EFFECTS

Plans for the use of water and land resources will give rise to beneficial and adverse effects that may affect either the components of national economic development or environmental quality objectives or the regional development and social well-being accounts.

Thus, there are national economic development beneficial and adverse effects, environmental quality beneficial and adverse effects, regional development beneficial and adverse effects, and social well-being beneficial and adverse effects. Also, beneficial and adverse effects may be monetary or non-monetary in nature; therefore, effects may be expressed in dollars, or in physical, biological, or other quantitative or qualitative terms appropriate to the account.

The accounts are not mutually exclusive in relationship of beneficial and adverse effects. A project measure may bring about beneficial or adverse effects to either or both the national economic development or environmental quality objectives. These effects will be shown in the appropriate accounts, including the regional development and social well-being. For example, land stabilization measures produce



national economic and regional economic development beneficial effects through contributions to increased outputs of goods and services as a result of increased or maintained productivity of the land or savings in cost. Likewise, these measures stabilize the regional economic base, preserve and enhance the quality of the environment, from a regional and national viewpoint, by improving visual quality, reducing soil loss and sediment deposition, improving water quality, etc. However, the measures would incur national and regional economic costs and wildlife habitat could be destroyed. All of these effects must be shown in the accounting system.

## INCIDENCE OF BENEFICIAL AND ADVERSE EFFECTS

The distribution among groups by time frame of beneficial and adverse effects is an important consideration in the evaluation of plans. Those groups who are appreciably affected by a plan should be identified. Those who are benefitted or adversely affected by a plan may be located within the planning area or region, or they may be in an area or region immediately adjacent, or they may be in distant regions which are non-contiguous with the planning area. Beneficial and adverse effects may occur immediately or at some point in the future or they may occur as a continuing or disjointed stream of effects. Appropriate discounting procedures must be used to reflect these conditions.

The accounting of these incidences of effects will be displayed in the regional development and social well-being accounts. These are further discussed and displayed in Chapters V and VI.

## MONETARY AND NONMONETARY EFFECTS

Beneficial and adverse effects may be of a monetary or non-monetary nature. They may be measured in dollars, or in physical, biological, or other quantitative units or qualitative terms appropriate to the account.

Contributions to national economic development and corresponding effects or regional development are of the monetary type (increased outputs and externalities). In addition, certain components of the social well-being account can be analyzed in terms of monetary values.

Beneficial effects which cannot or should not be expressed in monetary values will be expressed, insofar as is reasonably possible, in appropriate quantitative or qualitative physical, biological, or other measures relevant to the components of

the objectives or accounts under consideration. Most contributions to the social well-being account, some effects in the regional development account and all effects in the environmental account are in nonmonetary terms.

Likewise, certain adverse components may be expressed in monetary values whereas others will require descriptive or non-monetary expression. All adverse effects of the environmental quality account will be in nonmonetary terms.

## SCHEDULING

Cooperative (Type 4) river basin and PL 87-639 plans should be scheduled for implementation with regard to the priority of time sequenced needs as established by the relationship of existing and projected outputs versus future without conditions.

## UPDATED PLANS

Because of rapid changes in social, economic, technological, physical, and other factors, an implementation plan for a project prepared under these procedures that is not under construction within 10 years after completion of planning should be reviewed to ascertain whether it continues to be the best alternative to achieve the objectives.





# CHAPTER IV - PLAN FORMULATION

## INTRODUCTION

Plans will be directed to improving the quality of life by meeting current and projected needs and problems as identified by the desires of people. They should make contributions to society's preferences for national economic development and environmental quality. Plans will be formulated to reflect national, regional, state and local needs or problems consistent with these two objectives.

Planning of water and land resources is part of broader public and private planning to meet regional and local needs and to alleviate problems. Planning for water and land resources will be related to other regional or local planning activities and include participation of relevant and concerned interests.

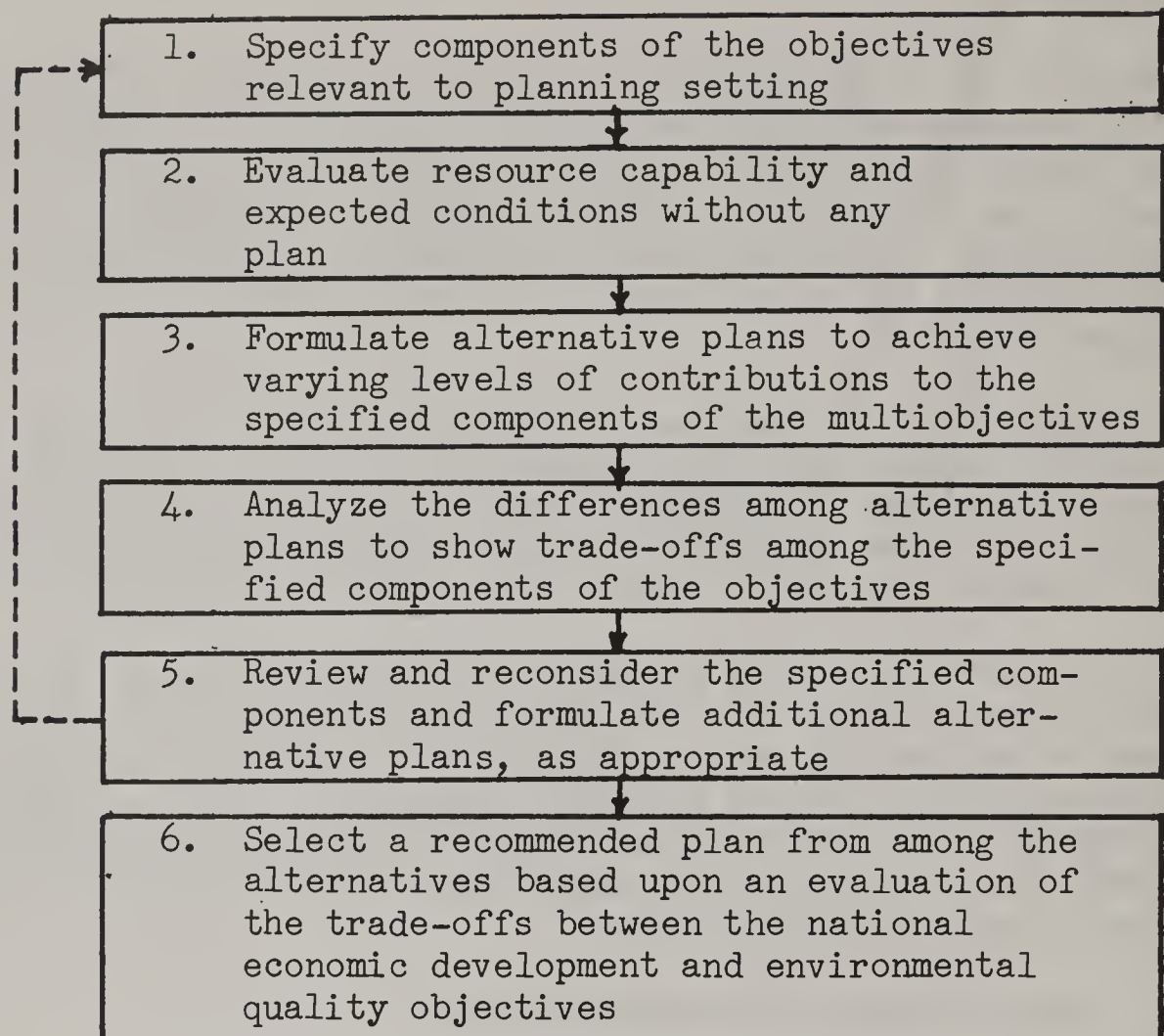
Plan formulation is a process through which desires are translated into satisfactions. The process will involve an orderly and systematic approach to making decisions. It will provide the interested public and the planning organization with an understanding of the assumptions employed, the data and information analyzed, the reasons and rationale used, and the range of implications of each alternative plan.

### 1. Major Steps in Plan Formulation

- a. Specify components of the objectives relevant to the planning setting;
- b. Evaluate resource capabilities and expected conditions without any plan;
- c. Formulate alternative plans to achieve varying levels of contributions to the specified components of the objectives;
- d. Analyze the difference among alternative plans to show trade-offs among the specified components of the objectives;
- e. Review and consider, if necessary, the specified components for the planning setting and formulate additional alternative plans as appropriate; and
- f. Select a recommended plan from among the alternatives based upon an evaluation of the trade-offs.

These steps may be repeated several times during the plan formulation process, each reiteration providing a change in detail or scope.

The major steps involved in this process are shown schematically as follows:



Departmental procedures for implementing the plan formulation process are outlined in the subsequent parts of this chapter.

## 2. Levels of Planning

These procedural guidelines for plan formulation apply to the preparation of framework studies and assessments, regional or river basin studies, watershed work plans and resource conservation and development measure plans. Differences in the application of the guidelines to these levels of planning appear in the selection of relevant component needs, the level of detail with respect to beneficial and adverse effects, and the number and types of alternative plans that are considered. The levels of planning, in content and order presented, provide a continuing approach to identifying and retaining the relationships essential to the scoping of studies that lead to project implementation.

a. Framework studies and assessments.

Framework studies and assessments will evaluate or appraise on a broad basis the needs and desires of interested people for the conservation, development, and utilization of water and land resources; will identify regions or basins with complex problems which require more detailed investigations and analyses; and may recommend specific implementation plans and programs in areas not requiring further study. They will consider federal, state, and local means of implementation.

Framework studies and assessments are designed to:

- (1) Determine the extent of water and land resource problems and needs;
- (2) Indicate approaches appropriate for their solutions; and
- (3) When applicable, identify specific areas where regional, river basin, or implementation studies are needed.

The information assembled will be consistent with the level of detail as outlined in guidelines for framework studies and assessments to be issued by the Water Resources Council. Complementarities and conflicts among components of the objectives will be identified. Alternative courses of action will be considered for each of the identified areas. Studies and assessments are not expected to provide a basis for recommending specific action for water and land resource development. However, comparisons will be made between alternative courses of action to provide a basis for a decision as to which areas require more detailed regional, river basin or implementation studies.

b. Regional or river basin plans.

Regional or river basin plans are reconnaissance-level evaluations of water and land resources for selected areas and are performed under planning authorities of Public Law 83-566 and Public Law 87-639. They are directed toward resolving the complex problems identified by framework studies and assessments or other federal-state investigations and terminate in a recommended plan or disclosure of possible alternative plans. They may vary widely in scope and detail; will consider present and long-range



problems with a focus on middle term (15 to 25 years) needs and desires; and will involve interested federal, state, and local entities.

Regional or river basin plans are concerned with a broad array of component needs of objectives. Alternate plans will consider effects on many components of objectives. Scheduling for implementation of the recommended plan or alternative plans will be presented to indicate the relationship to needs and the urgency or priority associated with meeting the needs.

c. Implementation studies.

Implementation studies are project feasibility studies undertaken by the Department. These studies may be conducted to implement findings, conclusions, and recommendations of framework and assessment studies, regional or river basin studies, other federal-state investigations or at the request of local government organizations. Implementation studies are directed toward carrying out the project installation authorities of Public Law 83-566, Public Law 78-534, and the Resource Conservation and Development program.

Plan formulation for implementation studies will focus on a recommended plan of action to follow within the next 10 to 15 years. Long-range projections of water and land resource needs will be considered; however, primary attention will be toward a plan to meet the near-term needs and alleviate problems. Plans will be directed toward a set of specific components of the two objectives which will be determined for the planning area. The plan formulation process will be responsive to the identified needs and problems that relate to the water and land resources in the area and the planning functions that may be employed to meet the needs.

## THE PLAN FORMULATION PROCESS

The concept of plan formulation implies the ordered bringing together of needs and desires as expressed by the people in such a manner that the most acceptable combination of needs and desires are fulfilled within the limits of the resources available. Plan formulation is not a step within itself but will be treated as an orderly and systematic approach to making determinations and decisions during each step of planning. Recognizing that formulation is a continuing process that may be reiterated during the overall planning process, the level of analyses probably should

not be detailed until the results of the initial or subsequent reiterations define the relevancy of the components and the scope and detail of alternatives that will be considered.

## 1. Specification of Components

### a. General.

At the outset and throughout the planning process, the specific components of the objectives that are significantly related to the use and management of the resources in the planning setting will be expressed in terms of needs and problems in the context of the objectives of national economic development and environmental quality.

The term "specific components of the objectives" refers to the desired achievement of types of goods, or services, and environmental conditions that are being sought as contributions to the objectives. The term "component needs" refers to the type, quantity, and quality of desired beneficial effects.

Local people and entities will be involved in identifying the existing problems and the needs, desires, and preferences of relevant interests concerning economic growth, social factors, and environmental quality. In addition, consideration will be given to the projected needs for goods, services and environmental amenities from the planning area as identified from the broader regional and national viewpoint.

Because of the uncertainties involved in projecting future needs and desires, a range of possible future needs and desires will be identified.

This information will provide the basis for judgmental decision concerning specific components of the objectives.

Further definition and description of the objectives presented in Chapter II and the subsequent sections on Participation, Projected Conditions and Preferences provide the guidelines for determining the full range of components of the objectives. Examples to illustrate the plan formulation process follow:

### b. National economic development.

For the national economic development objective, the components will usually be expressed at two levels.

(1) The first level directly relates to the objective as to kind of actual outputs of goods and services desired. Hence, the first level of specified components will generally be depicted in terms of these desires or their more efficient production, such as the following:

- Increased or more efficient output of food and fiber;
- Increased or more efficient output of recreational services;
- Increased suitability of land for agricultural activities;
- Increased or more efficient production of agricultural, municipal and domestic water supply.

(2) The second level of specification of the components of the national economic development follows from the translation of the first level specification into specific needs for water and land resources. This level will in general define study objectives or goals in terms such as:

- Water and land for irrigation;
- Water and land for recreation opportunities;
- Provisions of flood-free land or provisions of stabilized lands;
- Water supplies for municipal and domestic use;
- Drainage of agricultural land.

The above examples are not intended to exhaust either the wide variety of output of goods and services that can become specific components or the total range of specific water and land needs into which the first level of components is translated. The major point is that to determine the specific components of the national economic development objective, it will usually be necessary to approach the problem, first, at the general level of the types of national outputs of goods and services and then translate these into specific water and land needs or problems appropriate to the planning setting.

It should further be noted that the specifications of components of the national economic development objective at either level is stated in terms of outputs (which are the beneficial effects of a plan), but never in terms of the inputs to a plan. This holds true in the specification of the components of the environmental quality objective as well.



c. Environmental quality.

The components of the environmental quality objective may be directly expressed as the creation, management or preservation of, for example, the following:

- Areas of natural beauty;
- Quality of water, land and air;
- Biological resources and ecosystems;
- Geological, archeological, and historical resources.

2. Participation

The actual derivation and identification of components require several different approaches. An initial point of departure is the national and regional economic analyses and projections provided by the Council. These will be useful in a first-cut definition of the economic parameters of the components of the objectives. More detailed definitions will require in-depth consultation with federal, state, and local officials familiar with the planning setting.

Direct input from the public involved is required in order that problems and needs be given proper recognition at the outset of a study. The extent to which the above can be accomplished will vary by study. The principle, however, of working with the public to the extent that a mutual understanding is achieved is important and will be accomplished by:

- a. Soliciting public opinion early in the planning process;
- b. Encouraging periodic expression of the public's views, regarding their opinions, and considering them;
- c. Holding public meetings early in the course of planning to advise the public of the nature and scope of the study, opening lines of communication, listening to the needs and views of the public, and identifying interested individuals and agencies;
- d. Making available plans, reports, data analysis, interpretations, and other information not of a confidential nature for inspection by the interested public.

Public participation will be pursued through appropriate use of public hearings, public meetings, information programs, citizens' committees, soliciting views of key individuals, etc.

Definition and specification of the components of the environmental quality objective will require direct consultation with groups identified with environmental concerns as well as with those groups within a planning setting whose actions have significant impacts on the environment. A broad spectrum of public groups and interests will be considered and consulted in the identification of the components.

### 3. Projected Conditions

The components of the objectives will be identified for both current and future conditions. Projections will be made for selected years over a specified planning period to indicate how changes in population and economic conditions are likely to impact on the components over time.

Additional projections representing other views of the future may also be made. Such projections, however, will be made on a comparable basis with the baseline projections to enable valid comparisons to be made between alternative plans based on these different projections. Because demands for commodities and services are a function of price, the future needs are also affected by price. Assumptions relating to prices used to determine the future needs will be stated.

Projections of environmental requirements, comparable to the economic projections, have not been made. Therefore, it will be necessary to specify features of the environment that will assure achievement of surroundings which the general public considers acceptable. These environmental needs should reflect not only current preferences but should reflect preferences expected to prevail in the future. The environmental component need will then reflect not only current but future preferences.

### 4. Preferences

The specification of the components of the objectives must reflect the specific effects that are desired by groups and individuals of the planning area as well as the specific components declared to be in the national interest by the Congress or by the executive branch through the Water Resources Council. In this way, the components of objectives will reflect consideration of local, state, and national preferences and priorities as well as the extent of complementarity and conflict among components.

The identification and detailing of the components of the objectives will be viewed as the process of making explicit

the range of preferences and desires of those affected by resource development in terms that can form the basis for the formulation of plans. A range of possible levels will be set forth so that the relevant preferences can be seen for a given component. Initial specification of components will be modified (expanded or reduced) as appropriate during subsequent steps in plan formulation to reflect the capability of alternative plans to satisfy component needs and to reflect technical, legislative, or administrative constraints.

## EVALUATION OF RESOURCE CAPABILITIES

### 1. General

In this step of the process, initial evaluation is made of the availability of resources that can be employed to satisfy the current and future levels of demand. It will be initiated only after the objectives and component needs are identified.

### 2. Conditions for Evaluation

Resources of the planning area will be evaluated in terms of their physical ability to meet the current and projected outputs identified for each component under two sets of conditions; such as (a) capability of resources without any planned action, and (b) capability of water and land productivity enhanced through management plans.

An analysis of the capabilities of resources to meet the projected demands without any planned action will reveal the extent and magnitude of unsatisfied component needs and indicate the requirement for some specific plan of action to assure their satisfaction. The formulation of alternative plans will be undertaken in situations where water and land resources without any planned action are unable to meet current and projected needs or where resource management enables the needs to be met more efficiently.

### 3. Resources Inventory

A quantitative and qualitative inventory of pertinent land and water resource features of the planning area will be undertaken. Opportunities for further use of the resources will be appraised and problems limiting the use of resources will be identified. Present and projected conditions in both with and without project situations will be considered.



Examples of the types of information needed include:

- a. Hydrologic, geologic, and topographic data of the planning area;
- b. Current and committed water and land uses;
- c. Areas of natural beauty (green and open space, streams and river systems, lakes and reservoirs, beaches, shores, mountains, wetlands, estuaries, etc.);
- d. Biological resources and ecological systems;
- e. Geological, archeological and historical resources;
- f. Quality considerations of land, water, and air (quality as related to local, state, and national standards; sources of pollution; etc.);
- g. Land capability and use classifications.

Further detail of environmental inventory and assessment procedures and information on beneficial and adverse effects are found in Chapter V.

#### 4. Appraisal of Capabilities

Based on an analysis of the inventory, an appraisal will be made of the capability of the resources to support further use for the component needs. This will be used to guide the possible scope and magnitude of plans to meet the demands for each component. This appraisal requires identification of possibilities for management, development, or other opportunities for action such as:

- a. Reservoir sites;
- b. Preservation of scenic streams;
- c. Channel works;
- d. Land treatment and enhancement measures;
- e. Opportunities for preservation or enhancement of fish and wildlife;
- f. Opportunities for preservation or enhancement of cultural or archeological areas.



The appraisal will also consider needs for refinement of the specified objectives or the component needs which may be based on the inventory findings. These possibilities for management, development, or other actions will indicate the resources capabilities relative to specific commodities, services, or environmental amenities desired by society. By proper selection of these possibilities, alternative plans will be formulated to meet the needs for each component of the objectives.

Problems likely to present impediments to the attainment of the desired levels of national or regional output of goods and services, environmental amenities, or social opportunities for the time period under consideration will be identified. Such impediments as physical and legislative constraints that limit resource use or development, conflicts in resource use, and technological requirements will be considered.

## FORMULATION OF ALTERNATIVE PLANS

### 1. General

The objectives and component needs, specified in terms of needs and problems with information on resource capability and the broad outline of opportunities for management, development, and other actions, provide the basis to undertake the development of alternative plans.

Assurance that interested groups are knowledgeable and understand the planning information as developed at this point in the formulation process is essential.

The formulation of alternative plans to meet the specified components of the objectives will include the development of alternatives for national economic development and environmental quality. In addition, other alternatives will be formulated to reflect different levels of achievements. The beneficial and adverse effects of each alternative will be evaluated and displayed to the four accounts. Each alternative will then be tested for acceptability, effectiveness, efficiency, and completeness. The number of alternatives will generally be governed by consideration of the complementary or competitive aspects of the stated objectives. Formulation of additional alternative plans may be undertaken in recognition of limited resources, technical planning constraints, acceptability, and local and administrative authorities or constraints.

## 2. Nature, Type, and Number of Alternatives

The general nature, type, and number of other alternatives to be formulated will be guided by the following:

All relevant alternative means of meeting each of the component needs that may be included in an alternative plan should be identified. A preliminary physical analysis will be made for each alternative means in order to establish its apparent acceptability. Following a physical screening of relevant alternative means, those remaining will be evaluated on a preliminary basis to estimate beneficial and adverse effects to components of the system of accounts (Chapter VI). This assembly of preliminary information on alternative means of meeting component needs will refine the number of alternative means to be given further consideration. Ideally where there are few or no constraints and where the components of the two objectives are essentially complementary (the satisfaction of one component need does not preclude the satisfaction of the other component need), the formulation of a single plan would be sufficient.

In this case, a plan designed to provide contributions to components of one of the objectives may include components of other objectives so long as the original components are not compromised.

Following the preliminary screening and refining of alternative plans within a given set of assumptions concerning future change and the component needs associated thereto, the number and types of alternative plans to be further developed will be determined by more rigorously applying the following:

- a. Array components that are essentially complementary--that is the satisfaction of one of these component needs does not preclude the significant satisfaction of the other component needs or does not result in materially adding to the cost of satisfying the other component needs in the array; and
- b. Group component needs and the elements of a plan to satisfy those needs that are essentially in harmony, each set representing the nucleus of an alternative plan.

Identify alternative means of meeting each of the component needs to be included in an alternative plan. All relevant means should be considered. An analysis should be

made for each alternative means, including an identification of the beneficial and adverse consequences to other component needs. The assembly of information on alternative means of meeting the component needs will provide a basis for selecting the most effective means, or combination of means, for satisfying all component needs.

At this point, it should be possible to formulate alternative plans built upon the set of complementary components and alternative means. These essentially are the building blocks for the formulation of alternative plans. In formulating a given alternative plan, initial consideration will be given to its orientation toward fulfilling the component needs for one of the objectives. Further additions should be made for the component needs of the other objective, provided that their addition to a given plan does not significantly diminish the contributions of the overall plan to that objective toward which the plan is oriented. An analysis of the alternative plan, in terms of beneficial and adverse effects, will reveal the extent of any deficiencies against the other objective. The process is then repeated until sufficient numbers of alternative plans have been formulated so that there is at least one plan that generally satisfies each specified component need of the objective.

This does not mean that there must be a plan for each objective that excludes plan elements that significantly contribute to the component needs of other objectives nor does it mean that a given alternative plan cannot appropriately satisfy the component needs of both objectives.

A precise number of alternative plans cannot be specified in advance but will be governed by the relevancy of the objectives to a given planning setting, the extent of component needs and their complementarity, the available alternative means, and the overall resource capabilities of the area under study.

To facilitate comparisons and trade-offs among alternative plans and comparisons of beneficial and adverse effects measured in nonmonetary terms with beneficial and adverse effects measured in monetary terms, one alternative plan will be formulated in which optimum contributions are made to the component needs of the national economic development objective. At least one alternative plan will be formulated which emphasizes the contributions



to the environmental quality objective, and those alternatives that could be recommended and which include combinations of components providing various contributions to the national objectives.

### 3. Evaluation of Beneficial and Adverse Effects

The selected alternatives will be evaluated in terms of the beneficial and adverse effects on the national economic development and environmental quality objectives and on regional development and social well-being as a basis for further testing and analysis. Procedures from Chapter V will be used in this evaluation.

### 4. Tests for Acceptability, Effectiveness, Efficiency, and Completeness

Tests of acceptability, effectiveness, efficiency, and completeness will be applied to alternatives formulated within these guidelines.

a. The acceptability test refers to the workability and viability of the plan in the sense of acceptance by the public and compatibility within known institutional constraints.

b. The effectiveness test refers to technical performance of the plan and the level of contribution to the components of the objectives.

c. The efficiency test requires that among all acceptable alternatives, federal and nonfederal, water and nonwater, structural and nonstructural, the given alternative plan should be the least cost means, considering all adverse effects, of achieving specified components of the objectives when comparably evaluated according to these standards.

d. The completeness test requires that an alternative plan provide and account for all necessary investments or other actions that will be needed to assure the full realization of the contributions provided by the plan to the components of the objectives specified for the planning area.

### 5. Nondevelopment Plan

In formulating alternative plans to satisfy the component needs of the environmental quality objective, consideration will be given to an alternative which explicitly precludes any significant forms of physical construction or development.

Where such a "no development" alternative is considered, it must be recognized that positive action is nonetheless required to assure that the "no development" concept can be realized and, further, that the particular environmental characteristics that it is desired to maintain or enhance through the "no development" alternative may change through time as a result of changing conditions within a planning setting. Positive actions, such as zoning or public land acquisition, may be necessary to accomplish the "no development" alternative. In applying the four tests to this type of alternative plan, the test for completeness must be very carefully applied.

## ANALYSIS OF ALTERNATIVE PLANS

### 1. General

In this formulation step, an analysis and comparison of alternative plans will be undertaken to make the following determinations:

- a. The effectiveness of given alternative plans in meeting the component needs of the objectives;
- b. The differences between alternative plans in terms of their contributions to the objectives and where appropriate their effects on regional development and social well-being; and
- c. The relative value of those beneficial and adverse effects that are essentially presented in nonmonetary terms. To compare these effects to effects of the other accounts will require an expression of benefits foregone or added national economic development costs.

### 2. Procedures for Analysis

The first determination will involve the analysis of how well each alternative performs against the component needs that served as the basis for its formulation. The analysis will include an appraisal of the type and extent of deficiencies against component needs for which the plan was formulated as well as the extent of deficiencies against other component needs.

The second determination requires a systematic comparison of the performance of given alternatives with each other. The extent of differences among the alternative plans will be

used as a basis for reducing the number of plans to be considered in the selection of a recommended plan. The comparisons will be carried out to display the type of information on beneficial and adverse effects shown in Chapter VI.

The third determination involves an analysis designed to provide an approximation of benefits foregone and additional national economic development costs incurred to achieve environmental effects which are measured in nonmonetary terms.

## RECONSIDERATION OF COMPONENTS AND ALTERNATIVE PLANS

### 1. General

Plan formulation will be viewed as a continuous process that may require repeating one or more of the steps during the overall planning process. As planning proceeds, and as appropriate, the specified components will be reviewed and reconsidered.

### 2. Basis for Reiteration of the Process

Reiteration of the plan formulation process or modifying certain steps in that process should be based upon the following considerations:

- a. Level of detail is inadequate as basis for selection of a recommended plan;
- b. Alternatives considered result in significant deficiencies in meeting the component needs of one or both of the objectives;
- c. Resource capability and alternatives considered suggest that the initial specification of component needs was in error and requires modification;
- d. Public policy changes occurring during the planning study suggest change in emphasis for the objectives; and
- e. Additional information is obtained on resource capabilities or the technical aspects of alternative plans.

Determination of the extent and number of reiterations to be undertaken will be based upon a judgment as to whether or not new information, further detail, or other change in conditions as listed above are likely to result in either significant changes in the component needs or in the alternative considered.



# PLAN SELECTION

## 1. General

The culmination of the plan formulation process is the selection of a recommended plan from among the alternative plans. Based upon the analysis of alternative plans and the results of reiterations of the plan formulation process, a set of alternative plans should be developed--each one of which given the relevant mix of contributions to components of the objectives, could be selected on its own merits as a recommended plan or recommended course of action. It is from among these alternatives that a recommended plan will be selected. Procedures for development of a summary table to display beneficial and adverse effects of each alternative appear in Chapter VI.

## 2. Selection Process

The previous formulation steps will provide the number and types of alternatives that are to be considered as candidates for a recommended plan. In general, these alternatives will possess the following characteristics:

- a. For the given set of component needs, each plan should be the most efficient means to achieve those needs;
- b. The plans should be as significantly differentiated from each other as possible, primarily in terms of emphasis on objectives;
- c. Without regard to assigning priorities or weights to the component needs of a particular alternative to differentiate such alternative in terms of the other alternatives, each alternative will be "justified" in the sense that in the judgment of the planning organization the total beneficial effects (monetary and non-monetary) on the objectives relevant to the alternative are equal to or exceed the adverse effects (monetary and nonmonetary) on those objectives.

Selection of the recommended plan will be made by the interested and relevant public or private interest groups consistent with the location, nature, and expected impact of the plan. Choice from among the remaining alternatives will be governed by a reasonable and rational perception of priorities and preferences about the mix of objectives.

It is not a choice predicated upon an analysis of the most justified plan, since each alternative to be considered at this step of the overall formulation process can be justified on its own merits in terms of its contributions to the given mix of component needs relevant to each alternative.

If explicit priorities or weights were assigned to the beneficial and adverse effects to each component need of the objectives, it would be possible to select a best plan to be recommended with a minimum of judgment. In most cases, however, such priorities or weights will not be available and selection of a recommended plan will be based upon an appraisal so that the beneficial and adverse effects to the mix of objectives, to the best of current understanding and knowledge, reflect the priorities and preferences expressed by the interested public at all levels to be affected by the plan.

The basis of selection will be reported by indicating relevant considerations made in the selection process. A recommended plan must have net national economic development benefits unless deficiency in net benefits for the national economic development objective is the result of benefits foregone or additional costs incurred to serve the environmental quality objective. In such cases, a plan with a less than unity benefit-cost balance may be recommended as long as the net deficit does not exceed the benefits foregone and the additional costs incurred for the environmental quality objective. The Secretary of Agriculture will make an exception to the net benefits rule when he determines that circumstances unique to the plan formulation process warrant such exception.

An explicit presentation will be shown of the comparisons and resulting trade-offs of the recommended plan to other alternatives considered for recommendation. This will be shown in accordance with the system of accounts in Chapter VI.

# CHAPTER V - BENEFICIAL AND ADVERSE EFFECTS

## GENERAL

This chapter describes the procedures and methodologies as well as approaches USDA will follow in estimating beneficial and adverse effects to the accounts of national economic development, environmental quality, regional development, and social well-being.

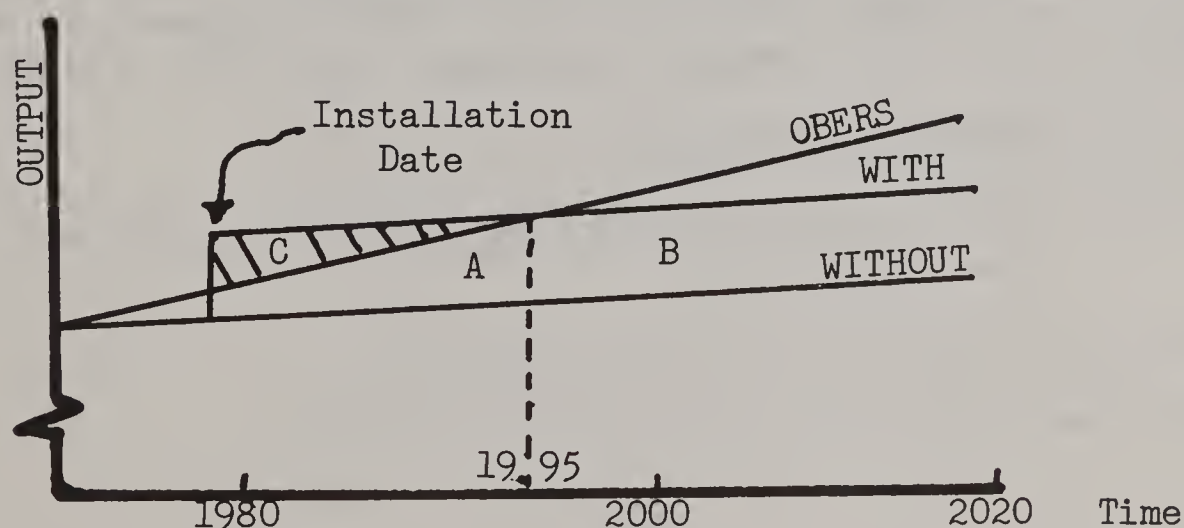
Detailed procedures for some measurements have not been developed. Detailed approaches to other measurement techniques are contained in Departmental guidelines and publications.

## USDA PROCEDURES AND METHODOLOGIES FOR MEASURING BENEFICIAL AND ADVERSE EFFECTS

### 1. National Economic Development

National economic development reflects increases and decreases in the Nation's productive output.

National economic development beneficial effects are increased goods and services and improvements in economic efficiency. Increases in output of goods and services will be limited to those required to meet the baseline projection for regional or river basin plans which have been developed with specific consideration of OBERS assumptions. Output in excess of the national baseline requirements will not be valued for the national economic development account. Both final and intermediate goods and services are subject to this constraint. However, baseline requirements are expected to increase during the project's effective life and will, therefore, require appropriate discounting for that period of time necessary for initial excesses to be required. A graphic presentation of this concept may more clearly focus on what will be involved.





In this presentation, discounting is required to determine that output which effectively contributes to national economic development during the period between project installation and 1995. The value of the project output shown in the regional development account would not be adjusted for any lag in accrual. Referring to the letters (A, B, and C) in the graph, the national economic development beneficial effects are the sum of areas designated by A and B. The regional development beneficial effects will add to this (A+B) the cross hatched area designated C, that is, A+B+C is the regional development beneficial economic effect.

As described in Chapter III, national and regional projections cannot be disaggregated to small project areas with any degree of reliability. Therefore, for these small project areas lacking data from existing or ongoing river basin studies, the graphic areas (A, B, and C) will be considered as contributing to national economic development.

The second facet of the national economic development beneficial effects derives from increases in the efficiency of production of existing levels of output. Wherever existing levels of output can be achieved at a reduced cost per unit, the measure of the national economic development effect will be the amount of cost reduction per unit times the without level of production.

A companion type of national economic development effect occurs where quality differentials result which are reflected in the market through the price mechanism. This price differential times the without level of production will be used as a national economic development beneficial effect.

It will be necessary to make the distinction between these two effects, increased efficiency and improved quality, where they result as enhancement type effects. Floodwater, erosion, and sediment damage reductions (both urban and agricultural) are considered as increasing the efficiency of committed factor inputs even though measured through output changes. As such, they are national economic development beneficial effects.

a. Beneficial effects

- (1) The value of increased outputs of goods and services from a plan.

(a) Flood prevention

The measurement of floodwater damages follows one of three methods. Each of the methods may be especially applicable to particular situations.

(i) Frequency method. This method involves the establishment of relationships between the physical and economic characteristics of floods and the frequency of flood occurrence. Physical associations, generally expressed by means of graphs, include the following:

- Runoff related to frequency of occurrence;
- Runoff versus discharge;
- Discharge versus frequency;
- Discharge versus flood stage;
- Flood stage versus area flooded.

The economic appraisal involves establishing and relating monetary values to the physical flood characteristics and to frequency of flood occurrences. This relationship generally involves the following graphs:

- Area flooded versus damage;
- Flood stage versus damage;
- Discharge versus damage;
- Damage versus frequency of occurrence.

The frequency series computes average annual damages by weighing the effect of all floods without estimating losses separately for each flood in a long series of events.

The seasonal distribution of floods must be taken into account when evaluating crop and pasture damages. This is necessary to reflect different stages of plant growth.

(ii) Historical series method. This method assumes that a sequence of events having occurred in the past also may occur in the future. Floods of extreme magnitude should be excluded or adjusted.

Economic appraisals of damages are based on stage-damage curves. After each of the various categories of damages have been appraised

for each flood during the evaluation period under future conditions without the project, they are summed and divided by the number of years in the period.

(iii) Net income. This procedure is applicable where nearly all damage is to crops and pasture and the control of flooding after project installation will be almost complete. It also is used where inseparable flood prevention and agricultural water management benefits are being evaluated.

The procedure consists of determining the land use, average crop yields, and net return without project conditions and comparing these with flood-free yields and the net return under project conditions. The difference in net return constitutes the flood damage. Increases in the net return over nonproject conditions as a result of project installation is the project benefit through reduction of damage.

In some projects floodwater spreads onto alluvial (or other) areas with no defined channel. Usually these areas are flat or only gently sloping and the floodwater spreads out until the flow eventually is dissipated.

Either the historical series or the frequency method may be used in the overland flow analysis. The distinction between overland flow and the usual methods of analysis is that flood damages are related to flood volume rather than peak flows experienced during flooding.

Flood damage reduction may permit changes to nonagricultural land use or an intensification of existing nonagricultural use. The basic principle involved in estimating beneficial effects is a measurement of increase in net return or saving in cost from alternate locations with the project versus without the project. In many instances there would be an opportunity for the same type of development elsewhere. If benefits are claimed for the project, the development in the benefited area should have advantages over outside development in terms of higher income, lower development costs, or both.



Only the difference between the project and other development net values after development costs are deducted can be considered a project benefit.

There are two kinds of changes in land use. In the first situation, the landowner benefiting from the change would not utilize the land resource affected by the new activity unless the plan has become operative. The benefit in this situation is measured as the difference in net income to the enterprise at an alternative location that would be utilized without the plan compared with the net income received by the landowner at the affected location which is improved or enhanced as a result of the plan. The second situation involves changes that might arise in the case of flood plain zoning. Effects to the enterprises in this category would be evaluated by measuring the net income change of the enterprises using the given land resource with the plan as compared with the without situation, plus the net income change for the enterprises that would be allowed to use the given land resource with the plan.

Flood plain zoning could have a significant beneficial national economic development impact by (1) helping to assure that efficient and proper use is made of flood-prone lands; (2) preventing large flood damages that would occur if unsuitable development were to occur; (3) eliminating or sharply reducing the need for local, state, and federal relief expenditures in the event of floods; (4) eliminating or sharply reducing the cost of constructing large-scale floodwater control works that sometimes merely transfer damages to another area; and (5) preserving and enhancing the recreation and fish and wildlife values of the region or area involved.

Where development will be the same with and without the plan, benefits attributable will equal total damages reduced. For the intensive land use cases where development or use of land will be different with and without the plan, benefits can be approximated as equal to the damages these enterprises could sustain in the absence of protection if located on the affected land.

(b) Erosion and sediment

Included are various forms of erosion and sediment damage. Erosion damages are classified as gully, streambank, and flood scour. Land may or may not recover from erosion damage. However, in most instances gully and streambank erosion is a permanent or nonrecoverable damage. Flood plain scour is usually temporary in that recovery of productivity is usually physically and economically feasible.

Sediment damage to land may be classified as deposition damage or swamping damage. Sediment damage also occurs to improvements and facilities. Some of the more common damages of this nature occur to reservoirs, residences, factories, etc.

The method to be used in the economic evaluation of land damage should be based on whether the damage is permanent, or only temporary with some degree of recovery of productivity possible. Where permanent damage to land is occurring or imminent, the method selected for estimating this damage should reflect the significance of this permanent loss. Where at least partial recovery of productivity is possible either through natural processes or other physically or economically feasible means, the estimate of damages should reflect changes in net incomes and costs appropriately discounted.

(i) Evaluation of permanent land damage. The evaluation of damage is based upon estimates of annual physical losses. The estimate of future damage should also recognize the various degrees of depreciation that may occur on lands immediately associated with nonrecoverable damage areas.

The net income method of analysis may be used to evaluate damages and benefits. This can be accomplished for agricultural land by developing enterprise budgets for each crop and weighing the values to arrive at net income per composite acre. Similar analysis would be used for nonagricultural areas. Benefits would equal the difference in net income from the undamaged or with project condition and the damaged or without project condition.

(ii) Evaluation of land damage subject to recovery. Generally, the evaluation consists of determining the difference in income from the flood plain under consideration with and without the project measures. Estimates are made of total area damaged, loss in productivity, years of recovery, and costs in weighing damages from the with and without situation. Appropriate discount procedures must be used.

(c) Drainage

Starting with conditions that exist at present in the project area, projections of the future without and with the project are made to evaluate project costs and benefits. In determining the without project condition for drainage, continuing deterioration of the resource base is recognized and appropriately discounted. In the with project condition, similar care must be exercised to recognize and account for any recovery time necessary to achieve the anticipated use level and efficiencies.

Agricultural drainage benefits consist primarily of increases in net farm income resulting from the increased quantity or quality of agricultural commodities or the reduction in crop production costs. Net farm income for drainage benefit analysis is defined as the return to the farm operator labor, management, and land which results from (1) increased output from the existing agriculture, (2) production of higher valued crops, and (3) reduction in crop production costs.

Accompanying "on-farm" drainage measures are normally required in addition to project structural measures to achieve the full agricultural potential of the area. Such on-farm measures will be evaluated and shown in the plan, along with other land treatment measures.

Nonagricultural land drainage benefits include the value of more intensive land use, a higher level of income, a quality environment resulting from improved vegetative cover, increased user days for recreation and open space, and improved environmental conditions in existing rural communities.



#### (d) Irrigation

Irrigation measures produce benefits that consist primarily of increases in annual agricultural income resulting from the provision of, or improvement in, available water supply to agricultural crops. These benefits consist primarily of increases in farm income resulting from the increased production of agriculture commodities or the reduction in crop production costs. Increased farm income is defined as additional returns to land, family labor, and management. Increased returns to farm operator labor are considered where it can be determined that in the absence of the proposed measures, the additional farm operator labor input would have either a zero or a lower income opportunity than with the proposed irrigation measures. In the rehabilitation of existing irrigation systems, additional beneficial effects may occur as a reduced cost in the operation and maintenance of the present irrigation facilities.

Increases in net returns are measured through the use of partial or complete budget analyses for both the with and without project condition. In estimating future cropping patterns and yield, consideration is given to the quality of soils and to the availability of water to meet all crop demands for the growing season. When less than a full supply is provided, consideration is given to priority crops. Reduced production costs are reflected in the budgetary analysis.

#### (e) Recreation or fish and wildlife

Evaluation of recreation or public fish and wildlife purposes that can be measured on a recreation-day basis involves the determination of needs, estimation of use and recreation-day values, and an assessment of recreation losses that may result from the alternative being evaluated.

The recreation need is that part of projected recreation requirements that will remain unsatisfied with the projected without condition.

Estimates of recreation use for the planning area are projected to future years. In formulating projections of recreation use, the following factors are frequently considered: population projections, estimated per capita participation in specific recreational activities, ratio of use between resident and nonresident use, potential recreational opportunities provided by the project or plan (sometimes limited by the carrying capacity of the resources involved), and alternative recreation opportunities. Factors affecting the choice of a per capita participation rate include the number and distribution of the population in the project or planning area; the socioeconomic characteristics of the population including disposable income, occupation, education, age, and mobility; and the population's leisure time and recreational habits as indicated by trends in hunting and fishing license sales, sales of recreational equipment, and trends in total recreation demand.

Monetary unit values that may be used for the evaluation of recreation benefits associated directly with public use of services made available by a project plan are stated in Chapter III. They provide a measurement of the amount that users would be willing to pay to avail themselves of the project's recreation resources if such payment were required. Two classes of outdoor recreation days, general and specialized, are differentiated for evaluation purposes.

A single unit value will be assigned per specialized and/or general recreation day regardless of whether the user engages in one activity or several. The unit value, however, should reflect the number and quality of available alternative activities; the degree to which opportunities to engage in a number of activities are provided; the expected degree of fishing and hunting success as dependent upon the character of fish and wildlife habitat; the general attractiveness of the area, including visual aspects of water quality and scenic characteristics of the area; and the effects of topography, climate, and presence of cultural and historic features on the "uniqueness" of the experience.

A separate range of values is provided for each class in order that informed judgment may be employed in determining the applicable unit values for each individual activity under consideration. Where considered appropriate, departure from the range of values provided is permissible if a full explanation is given.

After estimating the use and selection of a unit value, the benefits can be calculated as the product of estimated visitation times the unit day value.

(f) Municipal and industrial water supply

Sponsoring local organizations are responsible for estimating the benefits from inclusion of a water supply for municipal or industrial use in implementation studies. USDA, however, has the responsibility for checking the estimates made by sponsoring local organizations to assure benefits are realistic and to verify economic justification. USDA will not require the local organization to use any particular evaluation procedures, but it will indicate the nature of the tests it will make to assure that the purpose is worthy of inclusion in the project.

Municipal and industrial water supply is considered to be economically justified if it supplies water at no greater cost than the cheapest, most likely alternative source that would be utilized in the absence of the project. Where an alternative source is not available benefits may be estimated on the basis of the average cost of raw water from water supply projects planned or recently constructed in the general area or region. This information is helpful in estimating the upper limit of justifiable water costs.

(g) Land treatment systems

Land treatment systems include all conservation measures and associated management features included in the plan.



Benefits from land treatment systems are increased net incomes measured as maintained productivity, enhanced productivity, and reduced costs. Increases in net returns are measured through the use of partial or complete budget analyses for both the with and without project condition.

(h) Utilization of unemployed and underemployed labor resources

Beneficial effects from the utilization of unemployed or underemployed labor resources may occur as a result of the project or plan through employment during construction or installation of the project measures.

Where the planning region has unemployed or underemployed labor resources and it can be shown that these labor resources will in fact be employed or more efficiently employed as a result of the project or plan, the net additional payments to the unemployed or underemployed labor resources should be measured as a benefit. This analysis is not restricted to those regions designated by the Water Resources Council if, in fact, the planning area has experienced unemployment rates higher than the national average and is projected to remain above the national average in the future.

The magnitude of benefits as a result of project action from a national economic viewpoint will be based on that portion of the unemployed or underemployed labor resources that will be utilized in project installation, including land treatment measures. This percentage of the construction cost amortized for the evaluation period is the national economic development effect. The labor input should reflect skill categories and average wage rates by categories.

(2) Value of output resulting from external economies caused by a plan

Externalities resulting from project action are either technical or pecuniary. External economies are beneficial effects occurring to individuals, groups, or industries which may or may not benefit from the direct output of the project or plan. They result if an increase in the output of final consumer goods or

intermediate goods takes place beyond what would be obtained in the absence of the project or plan and over and above direct outputs of the project or plan.

Technological externalities involve changes in efficiency of production functions. Technological externalities exist only when efficiency gains occur to firms through the use of new or improved technology made profitable by the direct output of the project. Technological externalities will be computed as a reduced average cost per unit of output or as increased gross output times a profit coefficient representing the firm. In those cases where these effects are obviously less than the planning cost required to evaluate them, no evaluation will be made.

Pecuniary externalities relate to changes in income of firms economically related to direct and indirect users of project output. Pecuniary externalities will be estimated by the use of multipliers from existing input-output studies until such time as the Water Resources Council has provided appropriate multiplier values to use for specific planning studies.

Through the use of multipliers, measurements will be made of indirect effects associated with direct output. As previously discussed in Chapter III, all outputs from small projects are considered as contributions to national economic development for all areas where regional or river basin plans are not available. For Type 4 river basin and PL 87-639 surveys and for implementation studies within completed regional or river basin plans, all outputs within the baseline concept contribute to national economic development.

Indirect effects are the increased net returns which result from economic activity stimulated by production, utilization, and disposition of intermediate goods or services by the project or plan.

Indirect effects can be either beneficial or adverse. Project activities which increase the output of goods or services of a sector are considered to have beneficial effects. Those changes which reduce or eliminate the production of a sector are considered to have an adverse effect. As an example, the conversion of a wooded flood plain to agricultural production would have beneficial effects in the agricultural sector and adverse effects in the forestry sector. It is necessary to equally

consider all effects to derive the net external economies or diseconomies. Whether the project's indirect effect is beneficial or adverse will depend on the magnitude of change in each sector and the respective sector multiplier. The calculation of these effects will require sector recognition and delineation in determination of direct benefits.

As with all other effects analyzed, the base for indirect effects is the without and with project approach. The excess indirect effects which will take place in the nation with the project over these same effects that could be expected in the future in the absence of the project are beneficial effects. If such an excess does not exist, the adverse effect will be shown. While these effects will be determined by sectors whenever possible, the combined result will be shown in the project report.

To utilize multipliers from input-output studies, the following adjustments in the project benefits will need to be made before indirect effects can be calculated:

(a) Benefits which result from changes in the consumption pattern of the household or other demand sectors do not stimulate indirect effects. These are damage reductions to residences, businesses, roads, bridges, etc., where the elimination of the flood hazard does not result in an increased output and recreation benefits realized by residents of the region. Recreation benefits realized by residents of the region are considered as a shift in the consumption pattern of these residents. However, if the development provides a recreational experience unique to the region, it can be assumed that the use of the facility will eliminate the need for region residents to import into the region this type of recreational experience. This import reduction will generate indirect effects. An example of this type of exception would be water storage with facilities for water skiing in an area that previously had only streams. In this instance, the scenic value of the lake may also be unique.

(b) Benefits which are primarily esthetic in nature (recreation) to which simulated values are attached to enable reflection in monetary terms and benefits which are evaluated as the cost of the least costly



alternative (M&I water) do not meet the basic conditions of input-output analyses. However, to enable determination of generated effects known to occur as a result of recreation and industrial water use, the benefits as calculated will be used as the base for estimating the indirect effects. No indirect effects will be considered for municipal water.

(c) Benefit-cost analysis takes special care to keep benefits and costs separate whereas input-output studies consider them simultaneously. All benefit categories will be adjusted to determine net benefits relevant to the nation or region of concern. To adjust national economic development effects, it will be necessary to subtract the annual equivalent of the national economic cost for installation plus operation, maintenance, and replacement costs for a purpose from the benefits for that purpose. Net effects relevant to the region are determined by subtracting the annual equivalent of the local share of the installation cost plus operation, maintenance, and replacement costs for a purpose from the regional development effects for that purpose.

(d) The evaluation of the agricultural aspects of many USDA projects has stopped with crop production, even though it is known that the crops are intermediate to livestock production on the farms or ranches in the watershed. Where these situations exist, the value of product actually sold from the farm should be established.

(e) Transaction tables for input-output studies are short term static records of past economic activity in an area. Therefore, where a project is expected to cause a major change in the production inputs care must be exercised in using multipliers developed from historical relationships. The development of irrigation in a region where the existing agriculture is all or nearly all dryland would result in a situation where the change in technical coefficients would be of sufficient importance to prevent the unrestricted use of agricultural multipliers developed from historical information.

After the project benefits have been adjusted to conform to the requirements imposed by input-output studies, the indirect benefits are calculated by using the multiplier for the particular sector in which the benefits originate. The service sector is to be used to determine indirect effects of recreation and fish and wildlife purposes.

The measurement of national economic development external economies is thus the adjusted national economic development benefits to land and management less the annual cost of the project times the appropriate sector multiplier.

b. Adverse effects

(1) The value of resources required or displaced by the plan

The annual cost includes those required to install, operate, maintain, or replace all features of a project or plan throughout the determined period of analysis. Such cost includes the estimated construction, technical assistance, engineering services, land rights, project administration, and relocation costs. In addition, include any wages and salaries of displaced labor resources resulting from the project or plan.

Included with the annual cost of the project measures are the annual cost of land treatment measures evaluated as land treatment systems.

Measurements of loss in wages and salaries will follow the same procedure used for identifying the national economic development beneficial effects from utilization of unemployed and underemployed labor resources.

(2) Losses in output resulting from external diseconomies

External diseconomies are adverse economic effects of a plan that are not reflected in market prices of project inputs. They result when provisions of goods and services for one group necessarily result in an undesirable effect or disservice for another group. For example, an irrigation project may create drainage problems within or outside the project boundary. In this example, damages that must be accounted for are the direct loss in agricultural output plus any indirect effects associated with this loss.

Procedures for measuring national economic development external economies will be equally applicable for measuring external diseconomies.

(3) Losses in output from all resources displaced as a result of implementing the alternative plan

These costs occur as a result of certain resources being released and subsequently unemployed as a result of the project. The market value of the decreased output of goods and services can be measured as the loss in net income to the owners of the displaced resources and the wage payments lost by displaced labor as determined by a with and without analysis of the plan.

## 2. Environmental Quality

The exclusion of regional development as an objective to which water and related land resources can be formulated introduces a scope to environmental consideration which is not easily or concisely defined. As a result, those environmental components which do not contribute to national needs or priorities should be treated the same as national economic development output in excess of baseline projections. To keep this comparability between these two formulation objectives will require a listing or specification of those environmental components for which there exists known national needs and priorities. Consideration will be given to development of such a list at the national level.

A water and land use plan may have a variety of effects--beneficial and adverse--on environmental quality. While effects on environmental quality are characterized by their nonmarket, nonmonetary nature, they provide important evidence for judging the value of proposed plans.

Beneficial effects on the environmental quality account are contributions resulting from the management, preservation, or restoration of one or more of the environmental characteristics of an area under study or elsewhere in the Nation. Such contributions generally enhance the quality of life.

Adverse effects are consequences of the proposed plan that result in the deterioration of relevant environmental characteristics of an area under study or elsewhere in the Nation. Examples include acres of open and green space, wilderness areas, estuaries, wildlife habitat inundated or altered, or land experiencing increased erosion. Such adverse effects generally detract from or diminish the quality of life.



Often an environmental impact of a plan cannot be easily labeled as being beneficial or adverse, since that decision will vary with the perceptions of the individual concerned. In any case, the effect itself should be quantified and displayed for purposes of decision-making.

a. Measurement methods - Whether subjectively perceived or objectively measured, the criteria used to describe or evaluate the beneficial or adverse effects of a plan will vary--consistent with the relevant components of environmental quality under consideration. To the extent possible, however, beneficial or adverse effects will be displayed in terms of relevant physical and ecological criteria or dimensions, including the appropriate qualitative dimensions. For example, where the effects of a plan will be visibly evident, quantitative and qualitative descriptions may be made in terms of established or accepted water and land classification or ecological criteria and related measures.

Where significant physical effects are less easily perceived, it may be necessary to determine their extent through instrumentation or symptomatically by the presence or absence of commonly expected characteristics. As an example, eutrophication of fresh water lakes exemplifies a less easily perceived process that is reflected symptomatically, and which is subject to measurement by instrumentation with statistical analysis of data collected over time. Therefore, its rate of change is measured by reference to previous dates or periods with projected rates of future change based on probability analysis. As explicit an account of these effects as possible and supporting analysis will be provided.

Notwithstanding the physical or ecological criteria terms available, certain environmental effects can be presented most effectively by reference to their qualitative dimensions. For instance, it may be necessary to use this approach to show the importance of a reduction in use or availability for use of areas of natural beauty, archeological, or historical significance. Consequently, the analysis will be supported by an appropriate descriptive-qualitative interpretation and evaluation of the effects of the plan on the relevant components of environmental quality.

b. With and without analyses. Environmental conditions will be described and presented in terms that best characterize the planning perceptions and ecology of the affected area as conditions which would exist without

any plan. Similar descriptions will be prepared by time frames of the conditions to be expected with each alternate plan throughout the period of analysis. The conditions without the plan will provide the base from which to evaluate environmental effects--or prediction of change--under alternative proposals, including the consequence of failure to adopt a plan for development and use of resources in the area under study. It should be clear that environmental conditions will not remain static but will, in fact, tend to change over time regardless of whether a plan is adopted.

c. Limitations. It is not presently possible to anticipate or identify, much less measure, all environmental effects or change. Nor are there in existence evaluation standards that permit full and direct quantitative comparisons and ranking of the conditions of identifiable environmental effects that might be expected to result from a plan. Consequently, reasoned judgments by multidisciplinary teams will be required in many situations. When this is necessary, a frank expression of the state of knowledge and the limitations thereof, as well as the limitations of the analysis in each instance, is essential.

d. Components of the environmental quality objective. As previously discussed in Chapter II, components of the environmental quality objective include the following:

- (1) Management, protection, enhancement, or creation of areas of natural beauty and human enjoyment such as open and green space, streams and river systems, lakes and reservoirs, beaches, shores, wetlands, mountain and wilderness areas, and estuaries;

- (2) Management, preservation, or enhancement of especially valuable or outstanding biological resources (including fish and wildlife habitat) and ecosystems;

- (3) Management, preservation, or enhancement of especially valuable or outstanding ecological, archeological, and historical resources;

- (4) Enhancement of quality aspects of water, land, and air by control of pollution or prevention of erosion and restoration of eroded areas to harmonize land use objectives in terms of productivity for economic use and development with conservation of the resources;

(5) Avoiding irreversible and irretrievable commitments of resources;

(6) Others.

A quantitative and qualitative inventory will be made of as many environmental factors within each component as necessary to describe the resource, identify problems, define objectives to alleviate problems, and to assess the project's ability to meet objectives. A total inventory of all environmental factors is not intended except to the extent that it is pertinent to the planning objectives.

All effects, beneficial and adverse, will be expressed in terms of their impact on each environmental factor. A simple expression that the project will improve wildlife habitat is not sufficient. Rather, the statement should identify the animal species affected and the magnitude of the effect on the specific animal population and habitat with respect to the total supply within the planning area.

e. Environmental quality indicators. Each of these component categories is made up of various factors which will be specified and appraised individually. These factors are elaborated on in the Standards. Further elaboration has been made by a multiagency group in connection with the West Wide Study. The following is a list of indicators of environmental quality taken from the document prepared by that group to implement the Principles and Standards<sup>1/</sup> and from the Soil Conservation Service draft Environmental Assessment Procedure (August 1973). This will serve as a check list for identifying, evaluating, and interpreting environmental opportunities, conflicts, and trade-offs.

- Open and Green Space
- Streams and River Systems
- Lakes and Reservoirs
- Beaches and Shores
- Wilderness, Primitive, and Natural Areas
- Estuarine and Wetland Areas
- Other Areas of Natural Beauty
- Archeological Resources

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<sup>1/</sup> Guidelines for Implementing Principles and Standards for Multiobjective Planning of Water Resources. Working Draft II, August 1972.



Historical Resources  
Biological Resources  
Geological Resources  
Water Quality  
Land Quality  
Air Quality  
Sound Quality  
Other

### 3. Regional Development

The region consists of the geographic areas for which a plan for the use and management of water and land resources is designed. The region should be large enough to encompass all areas that will be physically affected by a plan, and include all contiguous counties that will incur significant economic effects.

Major considerations in delineating the region for regional development evaluation include the following:

Demand - where the users reside;  
Supply - where the water and land resources are located;  
Impact - where the major economic gains or losses extending beyond the direct users occur.

There can be variations in the delineation of regional boundaries because of the differences in the spheres of influence in serving one or more of the components of the national economic development or environmental quality objectives, the incidence of adverse effects, the area involved in cost sharing, and other factors. Consequently, careful identifications of the regional boundaries involved must be made in those situations where they cannot be assumed to coincide.

Political boundaries will be used to define regions. One regional definition can be the states. For Type 4 river basin studies and PL 87-639 joint surveys, the region may be defined by economic accounting areas or water resources subregions.

The evaluation of regional effects requires accounting for the incidence of effects between regions. With the exception of Type 4 river basin and PL 87-639 joint surveys which may specify other regional delineations, the delineation will normally be the state and the rest of the nation (RON). The incidence of effects between the regions should total to the

national economic development effect. This is because of the inherent assumption that regional effects over and above national economic development effects represent transfers.

a. Regional income

(1) Beneficial effects

(a) The value of increased output of goods and services accruing within relevant regions.

With the following exceptions the procedures and methodologies outlines for measuring the national economic development effects of this component are equally applicable to measuring the regional development effects. It will be necessary to display the incidence of regional development effects among regions. Due to the relatively small size of USDA implementation studies, recreation will be the principal purpose within this component which may accrue effects to non-residents of the region. In these situations, estimate the number of non-region recreation days of use and prorate this percentage of the national economic development benefits to the rest of the nation column (RON).

Likewise, any utilization of non-region unemployed and underemployed labor resources used in the installation of the project will need to be prorated among the regions. For river basin studies, other user effects may accrue outside the planning region.

(b) Additional net income accruing to the region from project installation and from other economic activities induced by operation of the project or plan.

Included within this subcomponent are increased net profits to firms located within the region and new wages and salaries to present and future residents of the region resulting from the operation and maintenance of the project features or from other economic activities induced by the project or plan.

Increased net profits may accrue to motel and restaurant operators through per diem expenditures of construction workers from outside the region. The regional expenditure by imported manpower will vary by project from a high where total disposable wages are spent to a low of just subsistence spending. As a minimum, the wages spent in the region by imported workers should be estimated. The amount of these expenditures, prorated among affected firms, times a representative profit coefficient for each category of firms, will approximate the regional income effect.

New wages and salaries from jobs created through project operation and maintenance or through economic activities induced by the project are gains to the region. The measurement of the wages and salaries should reflect part or full-time employment, occupational skills, and age and sex categories. Additional hired farm labor due to the project action is an example of this type of a regional income effect. As the flow of new wages and salaries would benefit the designated region for the term of the employment, benefits should not be discounted.

(c) The value of output resulting from external economies accruing within relevant regions.

Procedures and methodologies for measuring external economies relevant to the regional development account are basically the same as those outlined for national economic development.

Certain regional externality effects are locational or transfer effects from a national viewpoint. Locational effects are real and important to a region even though from the national view they sum to zero across all regions in the Nation. It is, therefore, necessary to determine which externalities reflect locational effects. Regional externalities are measured by taking gross regional income effects related to net income from management and land less adjustments to reflect consumable items less the annual equivalent of the local share of the installation cost plus OM&R times the appropriate regional multiplier. Locational effects are derived by multiplying the regional (Type I) income multiplier times increased net income plus wages and



subtracting from this the resultant from the regional externalities. The difference is locational effects and reflects transfers from the rest of the nation (RON).

(2) Adverse effects

(a) The value of resources contributed from within the region to achieve the outputs of a plan.

Included is the local share of the structural installation cost, the annual equivalent cost of the other conservation systems (excluding USDA cost-share payments), and the OM&R costs of project structural measures and other conservation systems.

To derive regional (local) costs of the structural measures will require the application of cost allocation and cost sharing procedures. Cost allocation procedures will be as specified in Chapter VII. Cost sharing will be in accordance with USDA authorities.

(i) Payment through taxes, assessments, or reimbursements by the region for resources contributed to the plan from outside the region.

Included is the local share of the federal cost derived by multiplying this amount by the percentage of federal income tax receipts paid by the region to total federal income tax receipts. This evaluation will be omitted for USDA implementation studies.

(ii) Loss of assistance payments from sources outside the region to otherwise unemployed or underemployed resources and displaced resources in the region.

The loss of any welfare or assistance payments to unemployed or underemployed resources as a result of the project will be reported. This estimate of loss should conform to the percentage of unemployed or underemployed labor forces utilized by the project who would receive assistance or welfare payments in the absence of the project. The estimate

should relate to historical information on number of welfare recipients in the impact area of the plan, the average welfare payments, and percent of federal contributions. Source data may be obtained from the Census of Population, County Welfare Boards, etc.

(iii) Losses in output in the region resulting from resources displaced and subsequently unemployed.

To be included are any losses in net income of capital resources or wages and salaries of labor forces which will become unemployed as a result of the project. The procedure for estimating this loss will be the same used to estimate beneficial effects from the utilization of unemployed or underemployed resources.

(iv) Losses of net income in the region from other economic activities displaced by construction or operation of a plan.

Included is any loss in net income or wages and salaries of resources which would remain employed but at a reduced rate with the project. Procedures for evaluation are the same for regional development as for national economic development.

(b) Losses in output resulting from external diseconomies to users residing in the region under consideration.

Included are the external diseconomies from reduction in direct output from the project take area and any other losses (formerly considered as induced damages). The procedure for determining external diseconomies is the same as that used to evaluate external economies.

## b. Regional employment

### (1) Beneficial effects

Included in this component is the estimate of increases in job opportunities, permanent or seasonal, by categories, that would result from implementation

of the project or plan. The estimate of jobs should correlate with the increases in regional income reported as "utilization of unemployed and underemployed labor resources" and "additional net income accruing to the region from project installation and from other economic activities induced by operation of the project or plan." Cost and return data, construction records, etc. are source data for estimating the number of jobs.

(2) Adverse effects

Adverse effects on regional employment are any decreases in the numbers and types of jobs resulting from the development.

c. Population distribution

(1) Beneficial effects will occur when populations of affected planning areas are stabilized or otherwise increased through in-migrations resulting from implementation of a plan.

Beneficial effects will be expressed narratively as the improvement or increase in population and related employment toward attainment of specified distributional goals.

(2) Adverse effects will be identified and measured as increases in the concentration of population and employment contrary to specified objectives.

d. Regional economic base and stability

(1) Beneficial effects

The economic base of a region consists of those activities which provide the basic employment and income on which the rest of the regional economy depends.

Beneficial effects include contributions to (a) balancing local and regional economies, (b) regularizing market activity and employment fluctuations, (c) offsetting effects of climatic vagaries and accompanying uncertainty, and (d) reversing decline of community growth.



To be included as contributions to "balancing local and regional economies" are statements on the historical relationship of income and employment of the planning area to its region and to the nation and any positive effect the project or plan may have in improving this relationship. "Regularizing market activity and employment" includes any positive contribution the project may have on stabilizing cyclical instability resulting from a narrow and specialized economic base, i.e. adding diversity to the agricultural base.

To be included as contributions to "offsetting effects of climatic vagaries and accompanying uncertainty" would be statements on the positive effects of project measures on stabilizing or enhancing the economic base of the planning area. For USDA projects or plans, the economic base will generally be agriculture. Therefore, to be included are descriptive statements on effects of irrigation, drainage, and flood prevention (including land stabilization) in maintaining or enhancing the agricultural base.

## (2) Adverse effects

Conversely, adverse effects are any disruption or loss in the stability of the economic base.

### e. Environmental conditions of special regional concern

To be included in this component are beneficial and adverse effects which have particular regional significance. Units of measurements are the same as those used in describing component effects on the environmental quality objective. Examples of environmental conditions of special regional concern are such things as the provision of elimination of open and green space in an urban environment, soil loss and sediment deposition, historical sites, and water quality.

## 4. Social Well-being

### a. General

With emphasis on their incidence or occurrence, beneficial effects on social well-being are contributions to the equitable distribution of real income and employment and to other social opportunities. Since they are integrally related to the basic values and goals of society, these

effects are usually not subject to monetary evaluation. The normal market exchange process, however, produces monetary values which can be utilized to aid in measuring the distributional impacts of projects and plans on real income.

Adverse effects of a project or plan on social well-being have detrimental impacts on the equitable distribution of real income and employment or otherwise diminish or detract from the attainment of other social opportunities. Additionally, such adverse effects include not only those incurred in the designated planning area, but also include adverse consequences elsewhere in the Nation resulting from implementation of the project or plan.

b. Beneficial and adverse effects

(1) Effects on real income

The incidence of regional income effects to broad income groups should be displayed. Current guidelines defining the family poverty line may be used as the base from which to identify the distribution of regional income effects. Income levels will be displayed in three broad categories. Display of benefits by income classes is of significant importance; however, it is not felt that the measuring technique should be exhaustive in detail. By using census and other secondary data coupled with investigation information collected during the planning process, it is felt that planning staffs can make reasonable estimates of this incidence of beneficial effects.

Likewise, the incidence of regional costs should be displayed for the same income grouping. Local provisions for obtaining funds will be the key for estimating this distribution by income groups. Where local funds are obtained through tax assessments local tax records would be a reliable source of information. Again, the analysis of this data should not be an exhaustive survey.

(2) Effects on security of life, health, and safety

Beneficial effects include contributions to

- (a) reducing risk of flood, drought, or other disaster affecting the security of life, health, and safety;
- (b) reducing the number of disease-carrying insects and related pathological factors; (c) reducing the concentration and exposure to water and air pollution; and

(d) providing a year-round consumer choice of foods that contribute to the improvement of national nutrition.

In those situations where historical experience is sufficiently documented to provide confidence in projecting likely future hazards, an estimate of the number of lives saved or the number of persons affected may be provided. In most instances, however, a descriptive-qualitative interpretation and evaluation of the improvement and expected results will be applicable.

Conversely, adverse effects are measured or described as increases in hazards to life, health, and safety.

(3) Educational, cultural, and recreational opportunities

Beneficial effects to this component include contributions to

(a) Improved opportunities for community services such as utilities, transportation, schools, and hospitals; and

(b) Preservation of cultural, historical, and scientific sites and provision of recreational opportunities on lakes, reservoirs, and in recreational areas.

Beneficial effects to improved community services may be described in appropriate quantitative terms, while increased cultural and recreational opportunities will be set forth as the numerical increase in the relevant facilities, otherwise accounting for size, use potential, and quality.

Conversely, adverse effects are identified and measured or described as detrimental effects on education, cultural, and recreational opportunities.

(4) Effects on emergency preparedness

Due to the small size of USDA projects, it is not felt that these projects will have any significant effect upon emergency preparedness.



# CHAPTER VI - SYSTEM OF ACCOUNTS

## INTRODUCTION

The system of public information accounts will display beneficial and adverse effects of each alternative plan on the components of the national economic development and environmental quality objectives and on regional development and social well-being to provide a basis for comparing alternative plans. The display of beneficial and adverse effects will be prepared in such manner that the different levels of achievement can be readily discerned and compared, indicating the trade-offs between alternative plans.

### 1. Displays

For purposes of accounting, the distribution of beneficial and adverse effects will be shown to whomsoever they accrue. This will include a display of the distribution of national economic development, environmental quality, regional development and social well-being effects to regions, income classes, and interest groups relevant to the particular plan and will reflect the cost information specified in Chapter VII. The system of accounts will display the beneficial and adverse effects among relevant regions and the rest of the Nation.

The system of accounts sets forth important aspects of information which must be generated and displayed if the decision-making process is to be effective. The evaluation framework provides for a systematic investigation of the full range and extent of effects of a plan; and the system of accounts provides for a display of this information in a format useful to all participants in the decision process.

The accounts to be used for displaying beneficial and adverse effects and for showing and analyzing the trade-offs between plans are national economic development, environmental quality, regional development, and social well-being.

Two series of displays will be prepared. In the first, beneficial and adverse effects and net beneficial project effects where appropriate will be displayed in four accounts for each alternative plan. The second series of displays will be used to provide a ready comparison of the alternative plans.

For implementation studies, watershed and RC&D projects, the incidence of regional development effects of a plan will be displayed between the smallest region containing the

project area for which regional estimates can be made (usually the state) and the rest of the Nation.

For river basin studies the system of accounts will also display the beneficial and adverse effects in the area relevant to the evaluation of the regional development account in relation to the other parts of the Nation. The number of economic accounting areas, as identified by the Water Resources Council, will vary dependent on the information available and the extent of the effects of the plan. It is not proposed that the effects of a plan be identified across all of the individual economic accounting areas.

The incidence of national economic development adverse and beneficial effects across the system of regional accounts must sum to the total national economic development adverse and beneficial effects evaluated for the plan. The incidence of locational effects (those effects which reflect trade-offs with other regions) across the system of regional accounts must sum to zero for beneficial effects and must sum to zero for adverse effects. In cases when an effect category includes both national economic development effects and locational effects, the sum of the effects for that category across the system of regional accounts will equal the total national economic development effects included in the category.

## 2. Area of Consideration

The use of the standard set of economic accounting areas of regional or river basin studies will not, however, rule out the use of other regions such as hydrologic regions or states whose delineations are important in measuring beneficial or adverse effects on specified components of the regional development account. However, the evaluation may also include an analysis of the effects of a plan utilizing the standard set of economic accounting areas provided by Water Resources Council.

## SYSTEM OF ACCOUNTS DISPLAY

The following illustrates the system of accounts display for a typical watershed area. Illustrated is one alternative plan which optimizes the national economic development objective (Plan A) and the selected or recommended plan. The major difference between these two alternatives is that Plan A does not reserve a specified storage capacity to meet the recreational demand. The selected plan provides such capacity.



The system of accounts sets forth a display of beneficial and adverse effects of the two alternatives on the components of the national economic development and environmental quality objectives and on the regional development and social well-being accounts. Although not included in this example, similar displays may be required in project reports for that alternative which optimizes national economic development, that alternative which emphasizes environmental quality, and for each relevant alternative plan representing constraints and trade-offs between the components of the national economic development and environmental quality objective that could be selected on its own merits as a recommended plan.

## 1. Watershed Description

The watershed illustrated contains 51,584 acres. Agriculture is the economic mainstay of the area. Livestock ranching is the principal type of enterprise in the watershed, producing both cattle and sheep. These ranches are typically diversified units with some hay and grain being raised on both irrigated and dry cropland. Irrigated cropland is an integral part of these ranch units.

The principal watershed problem is a shortage of irrigation water from July to October. Inefficient use is made of water during periods of high spring flows through excessive irrigation and poor distribution. Flooding occurs nearly every year. Damages occur to roads, bridges, fences, and irrigation systems.

The present water supply is obtained from diversions from the main stream within the watershed and partially from diversion from a stream outside of the project area. Present capacity of this latter diversion is 75 cfs; however, lesser amounts are available for mid- and late-season use. About 1,600 feet of this diversion are gullied from 8- to 20-feet deep and contribute to downstream sediment pollution and deposition.

Of the total 7,334 acres of irrigated cropland in the watershed, about 375 acres receive a full supply and about 6,959 acres receive a three-quarters supply or less in good water years. An additional 4,800 acres of cropland could be irrigated if water supplies were available.

The stream supplying the 75 cfs diversion from outside the watershed supports moderate to heavy fishing pressure from local sportsmen. The stream above the diversion draws fishermen from distances outside the county and is a productive trout stream. This area of the stream supports brook, cutthroat, and rainbow trout, whitefish, suckers, sculpin, dace, and other



minnows. It is designated as a "Class 2" trout stream. At times during the irrigation season, the entire flow of this stream is diverted into the watershed for irrigation purposes. This results in a half-mile section below the diversion being maintained only by ground water recharge. This part of the stream below the diversion is rated as "Class 3."

The watershed stream used for irrigation diversion is a "Class 4" stream with only county value. It supports brook trout, suckers, and minnows.

The full fisheries potential of both of these streams is presently unrealized due to inaccessibility and dewatering by irrigation diversions.

The watershed supports important wildlife populations, including furbearing and big game animals, game and non-game birds, and fish.

## 2. Plan A - National Economic Development Alternative

As formulated, Plan A includes a multipurpose reservoir with capacity of 11,480 acre-feet of which 440 acre-feet are for sediment, 660 acre-feet for flood prevention, and 10,380 acre-feet for irrigation of which 1,830 acre-feet may be used jointly for flood prevention. Other measures are canals and appurtenances, recreational facilities, and pumps for pumping irrigation water from drainage ditches.

Plan A makes no specific provision for recreation but recreational use can be provided through joint use of irrigation storage as substantial drawdown for irrigation will not occur until July.

# PLAN A - NATIONAL ECONOMIC DEVELOPMENT ALTERNATIVE

## NATIONAL ECONOMIC DEVELOPMENT ACCOUNT

<u>Components</u>		<u>Measures of effects</u>		<u>Components</u>		<u>Measures of effects</u>	
		(Average Annual) <sup>1/</sup>				(Average Annual) <sup>1/</sup>	
<b>Beneficial effects:</b>				<b>Adverse effects:</b>			
<b>A. The value to users of increased outputs of goods and services</b>				<b>A. The value of resources required for a plan:</b>			
1. Flood prevention		\$ 20,160		1. Multipurpose reservoir, irrigation structures and recreational facilities		\$ 76,810	
2. Irrigation		192,400		Project installation		14,600	
3. Recreation		35,500		OM&R			
4. Land treatment systems		6,850		2. Land treatment systems		5,300	
5. Utilization of unemployed and under-employed labor resources				Project installation		1,550	
				OM&R			
a. Project construction		3,500		3. Nonstructural (Identify)		-	
b. Land treatment construction		3,300		Project installation		-	
				OM&R			
B. The value of output resulting from external economies				4. Project administration		11,000	
1. Indirect activities associated with increased net returns from irrigation and flood prevention		394,300		B. Losses in output resulting from external diseconomies			
Total beneficial effects		\$656,010		1. Indirect activities from multipurpose reservoir take area		13,200	
				2. Increased transportation costs as a result of road relocation		2,000	
				Total adverse effects		\$124,460	
				Net beneficial effects		\$531,550	

<sup>1/</sup> \_\_\_\_\_ years @ \_\_\_\_\_ percent interest

# PLAN A - NATIONAL ECONOMIC DEVELOPMENT ALTERNATIVE

## ENVIRONMENTAL QUALITY ACCOUNT

<u>Components</u>	<u>Measures of effects</u>	<u>Components</u>	<u>Measures of effects</u>
Beneficial and adverse effects:			
A. Areas of natural beauty.	<ol style="list-style-type: none"> <li>1. Project output will make available regional funds and resources that can be used to enhance the physical appearance of 44 farms on 51,600 acres.</li> <li>2. Provide a full supply of water for irrigation use for 11,200 acres providing a green color contrast in a semiarid area.</li> <li>3. Create lake with 268 surface acres which will average 160 acres during April to September, with 4 miles of shoreline and excellent water quality.</li> <li>4. Inundate 268 acres of semiarid range and wet meadows along 2 mile stretch of stream.</li> <li>5. Disruption in tranquillity of rural environment by 15,200 recreational visitor-days.</li> </ol>	C. Biological resources and selected ecosystems.	<ol style="list-style-type: none"> <li>1. Create habitat for cold water trout fishing to accommodate 7,500 fisherman days.</li> <li>2. Enhances habitat and food supply and provides improved distribution of water for big game animals, game and nongame birds on 32,600 acres.</li> <li>3. Provide 268 acre resting area at the reservoir for migratory waterfowl.</li> <li>4. Inundates 2 miles of class 4 trout stream having limited population of brook trout, suckers and minnows.</li> <li>5. Inundates 15 acres of prime white-tail deer habitat in an area of influence having a whitetail population of 2,000 and comparable habitat of 6,000 acres.</li> </ol>
B. Quality considerations of water, land, and air resources.	<ol style="list-style-type: none"> <li>1. Eliminate future erosion of a 1,600 foot section of irrigation diversion which contributes 5 tons per year of downstream sedimentation.</li> <li>2. Reduce erosion on 32,000 acres of dry cropland, range and woodland.</li> <li>3. Enhance fire protection on 700 acres of forested land.</li> </ol>	D. Irreversible or irretrievable commitments.	<ol style="list-style-type: none"> <li>6. Reduces a 1/2 mile stretch of class 2 trout stream to class 3 value.</li> <li>7. 600 acres of wetlands which provide limited habitat for waterfowl and fur bearing animals will be lost.</li> <li>1. Conversion of 268 acres of semiarid range, wet haylands and phreatophytes to reservoir pool.</li> </ol>



PLAN A - NATIONAL ECONOMIC DEVELOPMENT ALTERNATIVE

REGIONAL DEVELOPMENT ACCOUNT

<u>Components</u>		<u>Measures of effects</u>		<u>Components</u>		<u>Measures of effects</u>	
Income:		State of		Income:		State of	
		(any state)				(any state)	
		Nation				Nation	
		(Average Annual)				(Average Annual)	
		1/				1/	
Beneficial effects:				Adverse effects:			
A. The value of increased output of goods and services to users residing in the region				A. The value of resources contributed from within the region to achieve the outputs			
1. Flood prevention	\$ 20,160	0		1. Multi-purpose reservoir, irrigation structures and recreational facilities	\$ 33,700	\$ 43,110	
2. Irrigation	192,400	0		Project installation	14,600	0	
3. Recreation	33,725	\$ 1,775		OM&R			
4. Land treatment systems	6,850	0		2. Land treatment systems	2,650	2,650	
5. The utilization of regional unemployed or underemployed labor resources				Project installation	1,550	0	
a. Project construction	3,500	0		OM&R			
b. Land treatment construction	3,300	0		3. Nonstructural (Identify)	-	-	
6. Additional wages and salaries accruing to the region from implementation of the plan				Project installation	-	-	
a. Utilization of hired labor associated with irrigation	47,400	-47,400		OM&R	2,800	8,200	
b. Recreation service sector	7,550	-7,550		4. Project administration			
c. Project OM&R (structures & land treat.)	14,200	-14,200		B. Losses of output resulting from external diseconomies to users residing in the region			
B. The value of output to users residing in the region from external economies				1. Indirect activities from multi-purpose reservoir take area	2,300	10,900	
1. Indirect activities associated with increased net returns from irrigation and flood prevention	101,700	292,600		2. Increased transportation costs as a result of road relocation	2,000	0	
2. Indirect and induced activities associated with utilization of regional unemployed and underemployed and other labor resources				C. Loss of assistance payments from sources outside the region to otherwise unemployed or underemployed resources			
a. Farm hired labor	15,700	-15,700		1. Loss of welfare payments	-2,400	+2,400	
b. Recreation service sector	2,500	-2,500		Total adverse effects	\$ 62,000	\$ 62,460	
c. Project OM&R	2,400	-2,400		Net beneficial effects	\$ 391,585	\$ 139,965	
d. Land treatment OM&R	2,200	-2,200					
Total beneficial effects	\$ 453,585	\$ 202,425					

1/ \_\_\_\_\_ years @ \_\_\_\_\_ percent interest

**PLAN A - NATIONAL ECONOMIC DEVELOPMENT ALTERNATIVE  
REGIONAL DEVELOPMENT ACCOUNT**

<u>Components</u>		<u>Measures of effects</u>		<u>Components</u>		<u>Measures of effects</u>	
		<u>State of</u>				<u>State of</u>	
		<u>(any state)</u>				<u>(any state)</u>	
						</	

# PLAN A - NATIONAL ECONOMIC DEVELOPMENT ALTERNATIVE

## REGIONAL DEVELOPMENT ACCOUNT

<u>Components</u>	<u>Measures of effects</u>	
	<u>State of (any state)</u>	<u>Rest of Nation</u>
Population Distribution		
Beneficial effects	Creates 48 permanent semi-skilled jobs, 2 permanent seasonal jobs and 67 semi-skilled jobs for 1 year primarily in an isolated rural area which has experienced a 19 percent reduction in population in the last 10 years	-
Adverse effects	-	-
Regional Economic Base and Stability		
Beneficial effects	Provides full season irrigation water supply for 11,200 acres in an area where agriculture is the economic mainstay. Creates 48 permanent semi-skilled jobs and 67 short-term semi-skilled jobs in an area where 13.4 percent of the families have incomes less than the national poverty level	-



PLAN A - NATIONAL ECONOMIC DEVELOPMENT ALTERNATIVE

SOCIAL WELL-BEING ACCOUNT

Components

Measures of effects

Beneficial and adverse effects:

A. Real income distribution

1. Create 48 low to medium income permanent jobs for area residents.
2. Created regional income benefit distribution of \$453,585 by income class as follows:

<u>Income class (dollars)</u>	<u>Percentage of Adjusted Gross Income in Class</u>	<u>Percentage Benefits in Class</u>
Less than 3,000	31	5
3,000-10,000	52	50
More than 10,000	17	45

3. Local costs to be borne by region total \$62,000 with distribution by income class as follows:

<u>Income class (dollars)</u>	<u>Percentage of Adjusted Gross Income in Class</u>	<u>Percentage Contributions in Class</u>
Less than 3,000	31	5
3,000-10,000	52	50
More than 10,000	17	45

B. Life, health and safety

1. Provide one percent level of flood protection.
2. Increased output will be in livestock products, an expected shift from surplus grains to nonsurplus hay.

C. Recreational opportunities

1. Creates 15,200 recreational visitor-day activities primarily for a rural farm population.

### 3. The Recommended or Selected Alternative

The selected alternative includes a multipurpose reservoir, enlargement and stabilization of the diversion canal, and delivery canals and appurtenant structures. The multipurpose reservoir will have a total capacity of 14,030 acre-feet; of which 440 acre-feet are for sediment, 500 acre-feet are for recreation, 720 acre-feet are for fish and wildlife, 11,350 acre-feet are for irrigation, including 1,830 acre-feet which will be used jointly for flood prevention, 640 acre-feet are for flood prevention, and 330 acre-feet are for design purposes to reduce spillway costs.

# SELECTED ALTERNATIVE

## NATIONAL ECONOMIC DEVELOPMENT ACCOUNT

Components		Measures of effects		Measures of effects	
		(Average Annual)		(Average Annual)	
Beneficial effects:					
A. The value to users of increased outputs of goods and services				A. The value of resources required for a plan	
1. Flood prevention		\$ 20,160		1. Multipurpose reservoir, irrigation structures and recreational facilities	\$ 99,800
2. Irrigation		192,400		Project installation	14,200
3. Recreation		38,000		OM&R	
4. Land treatment systems		6,850		2. Land treatment systems	
5. Utilization of unemployed and underemployed labor resources				Project installation	5,300
a. Project construction		4,800		OM&R	1,550
b. Land treatment construction		3,300		3. Nonstructural (Identify) Project installation	-
				OM&R	-
B. The value of output resulting from external economies				4. Project administration	14,400
1. Indirect activities associated with increased net returns from irrigation and flood prevention		326,760		B. Losses in output resulting from external diseconomies	
Total beneficial effects		\$ 592,270		1. Indirect activities from multi-purpose reservoir take area	13,800
				2. Increased transportation costs as a result of road relocation	2,000
				Total adverse effects	\$ 151,050
				Net beneficial effects	\$ 441,220

1/ \_\_\_\_\_ years @ \_\_\_\_\_ percent interest



# SELECTED ALTERNATIVE

## ENVIRONMENTAL QUALITY ACCOUNT

Components	Measures of effects	Components	Measures of effects
Beneficial and adverse effects:			
A. Areas of natural beauty.	<ol style="list-style-type: none"> <li>1. Project output will make available regional funds and resources that can be used to enhance the physical appearance of 44 farms on 51,600 acres.</li> <li>2. Provide a full supply of water for irrigation use for 11,200 acres providing a green color contrast in a semiarid area.</li> <li>3. Create lake with 327 surface acres which will average 214 acres during April to September, with 4 miles of shoreline and excellent water quality.</li> <li>4. Inundate 327 acres of semiarid range and wet meadows along 2 mile stretch of stream.</li> <li>5. Disruption in tranquility of rural environment by 16,700 recreational visitor-days.</li> </ol>	C. Biological resources and selected ecosystems.	<ol style="list-style-type: none"> <li>1. Create habitat for cold water trout fishing to accommodate 8,600 fishermen days.</li> <li>2. Enhance habitat and food supply and provides improved distribution of water for big game animals, game and nongame birds on 32,600 acres.</li> <li>3. Provide an average minimum flow of one cfs in a class 4 trout stream below the reservoir which will prevent the stream from going dry below the points of diversion as now happens during the irrigation season. This 720 acre feet can be managed to allow flushing flows of up to 15 cfs which will aid in maintaining channel characteristics.</li> <li>4. Provide 327 acre resting area at the reservoir for migratory waterfowl.</li> <li>5. Inundates 2 miles of class 4 trout stream having limited population of brook trout, suckers and minnows.</li> <li>6. Inundates 18 acres of prime whitetail deer habitat in an area of influence having a whitetail population of 2,000 and comparable habitat of 6,000 acres.</li> <li>7. 600 acres of wetlands which provide limited habitat for waterfowl and fur bearing animals will be lost.</li> </ol>
B. Quality considerations of water, land, and air resources	<ol style="list-style-type: none"> <li>1. Eliminate future erosion of a 1,600 foot section of irrigation diversion which contributes 5 tons per year of downstream sedimentation.</li> <li>2. Reduce erosion on 32,000 acres of dry cropland, range and woodland.</li> <li>3. Enhance fire protection on 700 acres of forested land.</li> </ol>	D. Irreversible or irretrievable commitments.	<ol style="list-style-type: none"> <li>1. Conversion of 327 acres of semiarid range, wet haylands and phreatophytes to reservoir pool.</li> </ol>

**SELECTED ALTERNATIVE**  
**REGIONAL DEVELOPMENT ACCOUNT**

<u>Components</u>		<u>Measures of effects</u> <u>State of</u> <u>(any state)</u> <u>Nation</u>		<u>Components</u>		<u>Measures of effects</u> <u>State of</u> <u>(any state)</u> <u>Nation</u>	
Income:		(Average annual) 1/		Income:		(Average annual) 1/	
<b>Beneficial effects:</b>				<b>Adverse effects:</b>			
A. The value of increased output of goods and services to users residing in the region				A. The value of resources contributed from within the region to achieve the outputs.			
1. Flood prevention		\$ 20,160	0	1. Multi-purpose reservoir, irrigation structures and recreational facilities		\$ 55,100	\$ 44,700
2. Irrigation		192,400	0			14,200	-
3. Recreation		36,100	\$ 1,900	Project installation			
4. Land treatment systems		6,850	0	OM&R			
5. The utilization of regional unemployed or underemployed labor resources				2. Land treatment systems		2,650	2,650
a. Project construction		4,800	0	Project installation		1,550	0
b. Land treatment construction		3,300	0	OM&R			
6. Additional wages and salaries accruing to the region from implementation of the plan				3. Nonstructural (Identify)		-	-
a. Utilization of hired labor associated with irrigation		47,400	-47,400	Project installation		-	-
b. Recreation service sector		8,100	-8,100	OM&R		700	13,700
c. Project OM&R (Structures & land treat.)		13,800	-13,800				
B. The value of output to users residing in the region from external economies				4. Project administration			
1. Indirect activities associated with increased net returns from irrigation and flood prevention		101,300	225,460				
2. Indirect and induced activities associated with utilization of regional unemployed and underemployed and other labor resources				B. Losses of output resulting from external diseconomies to users residing in the region			
a. Farm hired labor		15,700	-15,700	1. Indirect activities from multi-purpose reservoir take area		2,400	11,400
b. Recreation service sector		2,700	-2,700	2. Increased transportation costs as a result of road relocation		2,000	0
c. Project OM&R		2,400	-2,400				
d. Land treatment OM&R		2,200	-2,200	C. Loss of assistance payments from sources outside the region to otherwise unemployed or underemployed resources			
Total beneficial effects		\$457,210	\$135,060	1. Loss of welfare payments		-2,400	+2,400
				Total adverse effects		78,600	72,450
				Net beneficial effects		\$378,610	\$ 62,610

1/ \_\_\_\_\_ years @ \_\_\_\_\_ percent interest

# SELECTED ALTERNATIVE

## REGIONAL DEVELOPMENT ACCOUNT

<u>Components</u>		<u>Measures of effects</u> State of (any state)		<u>Rest of Nation</u>		<u>Measures of effects</u> State of (any state)		<u>Rest of Nation</u>	
Employment									
Beneficial effects:									
A. Increase in the number and types of jobs									
1. Agricultural employment		Utilization of 30 man-years of employment in agricultural production		-		1. Lost in agricultural employment of project take area		1 man-year of agricultural employment	
2. Employment in recreation service sector		2 permanent seasonal semi-skilled jobs		-		2. Lost in indirect and induced employment associated with project take area		.6 permanent semi-skilled jobs	
3. Employment for project construction		46 semi-skilled jobs for 1 year		-		Total adverse effects		1.6 permanent semi-skilled jobs	
4. Employment for project OM&R		.9 permanent semi-skilled job		-		Net beneficial effects		46.4 permanent semi-skilled jobs	
5. Employment in land treatment construction		31 semi-skilled jobs for 1 year		-				2 permanent seasonal semi-skilled jobs	
6. Employment in land treatment OM&R		.5 permanent semi-skilled jobs		-				77 semi-skilled jobs for 1 year	
7. Indirect and induced employment for project installation and output of project's goods and services		18 permanent semi-skilled jobs		-					
Total beneficial effects		48 permanent semi-skilled jobs		-					
		2 permanent seasonal semi-skilled jobs		-					
		77 semi-skilled jobs for 1 year		-					



SELECTED ALTERNATIVE  
REGIONAL DEVELOPMENT ACCOUNT

<u>Components</u>	<u>Measures of effects</u>	
	<u>State of (any state)</u>	<u>Rest of Nation</u>
Population Distribution		
Beneficial effects	Creates 48 permanent semi-skilled jobs, 2 permanent seasonal jobs and 77 semi-skilled jobs for 1 year primarily in an isolated rural area which has experienced a 19 percent reduction in population in the last 10 years	-
Adverse effects	-	-
Regional Economic Base and Stability		
Beneficial effects	Provides full season irrigation water supply for 11,200 acres in an area where agriculture is the economic mainstay. Creates 48 permanent semi-skilled jobs and 77 short-term semi-skilled jobs in an area where 13.4 percent of the families have incomes less than the national poverty level	-

SELECTED ALTERNATIVE  
SOCIAL WELL-BEING ACCOUNT

<u>Components</u>	<u>Measures of effects</u>		
Beneficial and adverse effects:			
A. Real income distribution	1. Create 48 low to medium income permanent jobs for area residents.		
	2. Create regional income benefit distribution of \$457,210 by income class as follows:		
	<u>Income class (dollars)</u>	<u>Percentage of Adjusted Gross Income in Class</u>	<u>Percentage Benefits in Class</u>
	Less than 3,000	31	5
	3,000-10,000	52	50
	More than 10,000	17	45
	3. Local costs to be borne by region total \$78,130 with distribution by income class as follows:		
	<u>Income class (dollars)</u>	<u>Percentage of Adjusted Gross Income in Class</u>	<u>Percentage Contributions in Class</u>
	Less than 3,000	31	5
	3,000-10,000	52	50
	More than 10,000	17	45
B. Life, health and safety	1. Provide one percent level of flood protection.		
	2. Increased output will be in livestock products, an expected shift from surplus grains to nonsurplus hay.		
C. Recreational opportunities	1. Creates 16,700 recreational visitor-day activities primarily for a rural farm population.		

A major contribution of the system of accounts is the identification of relevant beneficial and adverse effects of different alternatives whereby decision-makers can relate to the advantages and disadvantages of each alternative.

## SUMMARY TABLE

Within the planning process, it will be necessary for local decision-makers to analyze the various contributions of each alternative and select a recommended plan which best reflects their desired mix of the components of the national economic development and environmental quality objectives. To facilitate this selection, it will be desirable to develop summary tables for display at public meetings wherein the advantages and disadvantages of each alternative can be compared. From these displays and other displays of the physical and environmental relationship of each alternative, local decision-makers will be able to either select one of the alternatives presented as that which best meets their specified objectives or to identify additional alternatives to be pursued in the course of the study. Although no prescribed format is suggested for these public display tables, it is felt as a minimum the displays should include:

1. A map of the project area showing locations of problems and needs.
2. A map showing location of proposed measures, structural and nonstructural.
3. Tables identifying physical quantities and cost of proposed measures.
4. Summary tables comparing the beneficial and adverse effects among the alternatives. For these it is felt that the format of the following summary comparison tables would be desirable; however, for local decision-making it will be necessary to identify significant changes in the second level of specification of components; i.e., flood damage reduction, irrigation, recreation, etc.
5. Comparison tables for environmental factors. Due to limitations of describing environmental effects in quantitative and qualitative terms, the use of a rating system as set forth in the proposed SCS Environmental Assessment Procedures could facilitate local selection among alternatives from an environmental viewpoint.

Project reports are required to display a comparison of effects between the locally selected recommended plan and each of the other alternatives that could have been selected on its own merits as



the recommended plan. This display is the basis for informing reviewers of the local trade-offs made in the selection of the recommended or selected plan.

The information needed for this display of trade-offs will be taken from the system of accounts. The information should be summarized and condensed to make it as brief and yet as meaningful as possible. Differences between the recommended plan and alternatives should be set forth in a consistent manner so that positive and negative differences in beneficial and adverse effects are readily discernible.

The following summary comparison table illustrates the nature and content of data to be displayed. Although the example used compares differences between the national economic development alternative and the recommended or selected plan, the approach illustrated would be the same for comparing between alternatives that could be selected on their own merits as the recommended or selected alternative.

# SUMMARY COMPARISON BETWEEN PLAN A AND THE SELECTED PLAN

Account	Plan A	Selected Plan	Differences (Selected Plan minus Plan A)
<u>National Economic Development</u>			
Beneficial effects	\$656,010	\$592,270	\$ -63,740
Adverse effects	124,460	151,050	+26,590
Net beneficial effects	531,550	441,220	-90,330
<u>Environmental Quality</u>			
Beneficial and adverse effects			
C. Biological resources and selected ecosystems	Reduces a 1/2 mile stretch of "Class 2" trout stream to "Class 3" value	-	Maintains a 1/2 mile stretch of "Class 2" trout stream.
	-		Provides a perennial flow in "Class 4" trout stream.
<u>Regional Development</u>			
State of (any state)			
A. Income:			
Beneficial effects	\$453,585	\$457,210	\$ + 3,625
Adverse effects	62,000	78,600	+16,600
Net beneficial effects	391,585	378,610	-12,975
B. Employment:			
Employment for project construction	36 semi-skilled jobs for 1 year	46 semi-skilled jobs for 1 year	+10 semi-skilled jobs for 1 year
<u>Social Well-Being</u>			
C. Recreational opportunities	Creates 15,200 recreational visitor-day activities primarily for a rural farm population. (No specific capacity for recreation)	Creates 16,700 recreational visitor-day activities primarily for a rural farm population. (Provides capacity for recreation)	1,500 recreational visitor-day activities

## CHAPTER VII - COST ALLOCATION

This chapter sets forth the cost allocation procedure for use with the recommended or selected plan.

On the basis of the identification provided for in the system of accounts for beneficial and adverse effects, an allocation of appropriate costs shall be made when an allocation of costs is required for purposes of establishing cost sharing between the Federal Government and nonfederal public and private interests. All components of the national economic development and the environmental quality objectives shall be generally treated comparably in cost allocation and are entitled to their fair share of the advantages resulting from a plan.

### INTRODUCTION

The existence of joint contributions toward objectives and their components requires that an allocation of appropriate costs of a plan be made for purposes of establishing cost sharing between the Federal Government and nonfederal interests.

Only the installation cost and operation, maintenance, and replacement cost of the measures included in the selected plan will be allocated.

Objectives and their components will generally be treated comparably in the cost allocation with respect to the identification of alternatives, the evaluation of alternatives, and the determination of incremental and/or separable costs. The optimum national economic development plan serves as the base for cost allocation. Only national economic development costs are allocated.

### SUMMARY OF THE COST ALLOCATION METHOD

The cost allocation method described herein is a modification and extension of the separable costs-remaining benefits method of cost allocation.

In the two objective settings, cost allocation becomes a two-stage process involving the allocation of national economic development costs between objectives and then the further allocation of costs among second order components of objectives, hereafter called purposes of the objective.

For cases where features of a plan are included to serve the environmental quality objective and at the same time contribute incidentally to the national economic development objective, the



method provides that the net incremental costs of such features be allocated to the environmental quality objective. Case 1, attached, is an example relating to this circumstance.

For cases where features of a plan are designated to serve the environmental quality objective at the loss of net beneficial effects on the components of the national economic development objective served by the plan, and for cases where the entire plan is designated to serve the environmental quality objective at the loss of net beneficial effects on national economic development, the method provides that costs equivalent to the net national economic development beneficial effects foregone be allocated to the environmental quality objective. Case 2 is an example relating to this circumstance.

Under the second stage, the method provides for the further allocation of national economic development costs allocated to the national economic development objective in stage 1 among the purposes of the objective, i.e., flood prevention, irrigation, etc. Costs will be allocated among the purposes of the objective using the separable costs-remaining benefits method of cost allocation. This allocation will be by systems of interrelated measures or, in cases of non-interrelated measures, on a structure by structure basis. NED costs will not be allocated to external economies and unemployed or underemployed resources. In the case of the environmental quality objective, this would be done by allocating to each component of that objective a share of the national economic development cost based on the relationship of alternate costs of achieving these effects through single purpose means.

## THE COST ALLOCATION METHOD

### 1. Cost Allocation Among Objectives

When features of a plan are included to serve the environmental quality objective or its components, an allocation will be made to the environmental quality objective. The amount to be allocated to this objective is the incremental national economic development costs less any incremental national economic development beneficial effects simultaneously achieved.

### 2. Cost Allocation Among Purposes

#### a. National economic development objective.

National economic development costs allocated to the national economic development objective under the procedures discussed above for stage 1 shall be further allocated among purposes of that objective in the following manner:

- Not less than the separable national economic development costs of achieving the beneficial effects, attributable to each purpose determined under the assumption that each purpose is in turn omitted last from the plan.

- Nor more than the lesser of the beneficial effects or the costs, comparably evaluated, of the alternative means most likely to be undertaken in the absence of the plan of obtaining the beneficial effects attributable to each purpose.

Remaining joint national economic development costs (the total national economic development costs allocated to the national economic development objective in stage 1 less the sum of the separable national economic development costs determined for each purpose of that objective) shall be allocated among all purposes in proportion to the lesser of beneficial effects or alternative costs less any separable costs previously allocated to each purpose of the national economic objective.

b. Environmental quality objective.

When required for establishing cost sharing, the costs allocated to the environmental quality objective in stage 1 will be further allocated among purposes of such objective in proportion to the costs of the alternative means most likely to be undertaken for obtaining the beneficial effects attributable to each component.

## APPLICATION OF THE COST ALLOCATION METHOD

The cost allocation method described herein will be applied to all multiobjective and multipurpose reservoirs. For other measures, i.e., multiple-purpose channel work, etc., current allocation procedures will be used.

## REVIEW OF COST ALLOCATION

Cost allocations will be reviewed to the extent appropriate when new contributions are made to objectives or their contributions cease, or when there is a material change in the level of contributions made toward the objectives and their components served by a project or plan. A revised cost allocation or a modification of the existing allocation will be made if, as the result of such review, it appears that a significant inequity may result if the existing allocation is not revised or modified. Due consideration will be given, in the event of a revision or modification of an existing allocation, to the relative periods of time over which contributions are made to the various objectives and their components.

## ILLUSTRATIONS OF COST ALLOCATION METHOD

Case 1 - Incremental scale for the environmental objective included in plan intended primarily to serve the national economic development objective.

### A. Project Data

	<u>NED Plan</u>	<u>Recommended Plan "B"</u>
<u>NED objective</u>		
Benefits <u>1/</u>		
Flood prevention	\$ 50	\$ 50
Recreation	20	30
Irrigation	<u>30</u>	<u>40</u>
Total	\$100	\$120
Costs <u>1/</u>		
Project installation and OM&R	\$ 50	\$ 90
Net benefits	\$ 50	\$ 30
<u>EQ objective</u>		
Effects	1. 3,000 acres flat water.	1. 3,500 acres flat water.
	2. --	2. Meets State water quality standards over 100 mile stream.
	3. Inundate 10 miles free flowing stream.	3. Inundate 11 miles free flowing stream.

1/ Benefits and Costs must be in either capitalized values or average annual values.



B. Allocation of NED Costs Among Objectives

1. Incremental NED costs and incidental incremental NED benefits associated with incremental scale included in Plan B intended to serve the environmental quality objective (reservoir capacity for downstream low flow augmentation).

	<u>NED Plan</u>	<u>Recommended Plan B</u>	<u>Difference</u>
<u>NED objective</u>			
Benefits	100	120	20
Costs	50	90	40

Thus: Gross incremental NED costs = 40

Net incremental NED costs = 20

2. Remaining joint NED costs of Plan B

Total NED costs of Plan B	90
Less net incremental NED costs of Plan B	<u>-20</u>
Remaining joint NED costs of Plan B	70

C. Allocation of NED Costs Among Components of the NED Objective

1. Separable NED costs for NED components

	<u>Plan B</u>	<u>Plan B with FP omitted</u>	<u>Plan B with Rec. omitted</u>	<u>Plan B with Irrig. omitted</u>
Total NED costs	90	80	85	65

Separable NED costs

Flood prevention	10
Recreation	5
Irrigation	<u>25</u>
Total	40

2. Remaining joint NED costs of NED objective

Total NED costs allocated to NED objective 70

Less total separable NED costs for  
NED components -40

Remaining joint NED costs of NED objective 30

3. NED cost allocation table for Plan B for NED components.

	:	<u>NED Components</u>			:	
	:	FP	Recreation	Irrig	:	Total
1. Benefits	:	50	30	40	:	120
2. Alternative NED costs	:	20	50	30	:	100
3. Benefits limited	:	20	30	30	:	80
4. Separable NED costs	:	10	5	25	:	40
5. Remaining benefits (% distribution)	:	10 (25%)	25 (63%)	5 (12%)	:	40 (100%)
6. Remaining joint NED costs	:	7.50	18.90	3.60	:	30
7. Total allocated NED costs	:	17.50	23.90	28.60	:	70

Case 2 - Increment of scale to serve the environmental objective causing a reduction in the beneficial effects to the national economic development objective.

A. Project Data

	<u>NED Plan</u>	<u>Recommended Plan "D"</u>
<u>NED objective</u>		
Benefits <u>1/</u>		
Flood prevention	\$ 50	\$ 50
Recreation	30	20
Irrigation	<u>40</u>	<u>30</u>
Total	\$120	\$100
Costs <u>1/</u>		
Project installation and OM&R	\$ 90	\$ 80
Net benefits	\$ 30	\$ 20

EQ objective

Effects	1. 3,500 acres flat water.	1. 3,000 acres flat water.
	2. --	2. Meets State water quality standards over 100 miles stream.
	3. Inundate 11 miles free flowing stream.	3. Inundate 10 miles free flowing stream.

1/ Benefits and Costs must be in either capitalized values or average annual values.



## B. Allocation of NED Costs Among Objectives

1. Incremental NED costs and incidental incremental NED benefits associated with feature included in recommended plan operated to serve the environmental quality objective (reservoir capacity for downstream low flow augmentation).

<u>NED objective</u>	<u>NED Plan</u>	<u>Recommended Plan D</u>	<u>Difference</u>
Benefits	120	100	-20
Costs	<u>90</u>	<u>80</u>	<u>-10</u>
Net benefits	30	20	-10

### Note:

In this case example, it has been assumed that in the absence of providing service to the EQ objective, the irrigation and recreation components would be scaled within the plan to maximize net NED benefits. As shown above, additional incremental NED costs for specific irrigation and recreation facilities to maximize these net benefits are assumed to be \$10 under an alternative operating plan where no provision is made for low flow releases. Incremental NED benefits for irrigation and recreation are assumed to be \$20 under such an alternative operating arrangement.

A further implied assumption in this case example is that it is more efficient to forego irrigation and recreation net benefits than it would be to add additional capacity in the reservoir to make low flow releases beyond that which maximizes irrigation and recreation net NED benefits. This may frequently be the case, i.e., to increase reservoir capacity beyond that assumed for either alternative operating arrangement would be very costly due to, for example, major road, railroad, or bridge relocations.

In this situation, the concept of gross incremental costs and net incremental costs has to be viewed in terms of net NED benefits foregone.

Thus: Gross incremental NED costs = \$10  
Net incremental NED costs = \$10

### 2. Remaining joint NED costs of Plan D

Total NED costs of Plan D	\$ 80
Less net incremental NED costs of Plan D	<u>-10</u>
Remaining joint NED costs of Plan D	<u>\$ 70</u>

C. Allocation of NED Costs Among Components of NED Objectives

1. Separable NED costs for NED components

	<u>Plan D</u>	<u>Plan D with FP omitted</u>	<u>Plan D with Rec. omitted</u>	<u>Plan D with Irrig. omitted</u>
Total NED costs	80	70	75	60

Separable NED costs

Flood prevention	10
Recreation	5
Irrigation	<u>20</u>

Total 35

2. Remaining joint NED costs of NED objective

Total NED costs allocated to NED objective 70

Less total separable NED costs for  
NED components -35

Remaining joint NED costs of NED objective 35

3. NED cost allocation table for Plan D for NED components.

	<u>NED Components</u>				
	<u>FP</u>	<u>Recreation</u>	<u>Irrig</u>		<u>Total</u>
1. Benefits	50	20	30	:	100
2. Alternative NED costs	30	40	25	:	95
3. Benefits limited	30	20	25	:	75
4. Separable NED costs	10	5	20	:	35
5. Remaining benefits (% distribution)	20 (50%)	15 (38%)	5 (12%)	:	40 (100%)
6. Remaining joint NED costs	18	13	44	:	35
7. Total allocated NED costs	28	18	24	:	70





# CHAPTER VIII - COORDINATION AND REVIEW OF PLANNING STUDIES

## INTRODUCTION

USDA planning and participation in planning will be carried out on a coordinated basis with other agencies and entities. The Department will participate in joint federal agency-state planning for regions or river basins in which arrangements have been provided by the Council.

The Department will use the Water Resources Council's standards for coordination and consideration of problems of mutual concern with other federal agencies and interested regional, state and local public agencies and private interests. Existing organizations and arrangements for coordination, such as river basin commissions, federal-state interagency committees, interstate bodies, and state and local agencies will be utilized where appropriate.

## NATIONAL PROGRAM OF PLANNING STUDIES

The Water Resources Council prepares and updates a national program of water and related land resource planning studies. This program includes a long-range schedule of priorities for:

- Framework studies and assessments.
- Regional or river basin plans.
- Implementation studies.

### 1. Framework Studies and Assessments

USDA through its planning authorities will participate in framework and assessment studies relating to land and water resources. Studies will be coordinated in accordance with program guidelines established by the Council.

### 2. Regional or River Basin Plans

USDA will participate, as appropriate, in the development and implementation of plans of study which, in accordance with Council guidelines, provide arrangements for study coordination and management. Reports are submitted to the Council by the planning manager or other Council-designated entity.

### 3. Implementation Studies

#### a. Field coordination of implementation studies.

##### (1) Watershed Work Plans (PL 83-566).

Departmental procedures include provisions for informing field offices of interested federal departments and agencies, river basin commissions, states, concerned local agencies and organizations, and the general public of the initiation of implementation studies. This communication will request statements as to interests, available pertinent data, and comments and suggestions.

Following agreement on the specification of components of the objectives as provided by Chapter IV, Plan Formulation, the Department will prepare a public statement of the specified components of the objectives and probable effects of the plan on the components.

During the plan formulation process, the responsible state conservationist, Soil Conservation Service, will periodically communicate with other interested federal departments and agencies; state agencies; river basin commissions; and concerned local agencies, organizations, and the general public to exchange information of mutual concern.

##### (2) RC&D Measure Plans.

When planning is to be initiated for applicable RC&D measures, the SCS state conservationist will notify concerned public agencies and request pertinent data, arrange for obtaining their assistance, and provide for comments on coordinating activities regarding plan formulation.

#### b. Field review.

##### (1) Watershed Work Plans (PL 83-566).

Prior to forwarding to the Administrator, Soil Conservation Service, work plans completed by the staff of the state conservationist will be forwarded to other field offices of federal departments and agencies, river basin commissions, states, and concerned local entities for review and comment. Work plans will be revised to reflect mutually acceptable changes. Unresolved issues will be recorded in the transmittal to the Administrator.

(2) RC&D Measure Plans.

RC&D measure plans will be submitted to appropriate field offices of concerned public agencies for review and comment. The RC&D measure plans will be revised as necessary to reflect mutually acceptable changes.

Suggested changes that are not resolved will be recorded in the field office comments.

c. Review of implementation study reports.

(1) Watershed Work Plans (PL 83-566).

Watershed work plans to be submitted for congressional approval will be referred by the state conservationist, Soil Conservation Service, to the heads of other interested departments or agencies in Washington, D.C., and to states for review and comment.

Watershed work plans to be approved administratively shall be reviewed in the same manner except that they will be referred to the appropriate field offices or the heads of other interested departments or agencies in Washington, D.C. as designated by the department or agency.

The Water Resources Council will review and comment on watershed work plans to be submitted for congressional approval:

- (a) in areas covered by approved regional or river basin plans
- (b) that contain innovations in planning procedures or cost-sharing arrangements
- (c) which have unresolved evaluation or coordination problems.

Watershed work plans in these three categories which are to be approved administratively will be furnished to the Council for information purposes only.

Watershed work plans requiring congressional approval will be forwarded by the Secretary of Agriculture to the Office of Management and Budget for transmittal to the Congress. Copies of comments received from the Water Resources Council, other concerned federal departments or agencies, and states will be attached to the transmittal, unless included in the attached EIS. The Administrator shall determine that all statutory requirements



have been met and that there is no apparent conflict with other water and land resource projects or programs.

(2) RC&D Measure Plans.

RC&D measure plans will be referred by the SCS to other public agencies for review and comment when (1) such agencies have participated in plan development, have a clear interest, or the SCS desires comments or views; and (2) in the opinion of the SCS Administrator, comments or views of other public agencies are desirable or necessary prior to initiating construction activities.

## USDA COOPERATIVE (TYPE 4) RIVER BASIN STUDIES

Cooperative (Type 4) river basin studies are authorized under Public Law 83-566, Sec. 6 and Public Law 87-639. They will be coordinated and managed within arrangements agreed to between the Administrator, Soil Conservation Service, and the cooperating state and federal agencies. Copies of reports resulting from cooperative (Type 4) river basin studies will be distributed for information by the Administrator, Soil Conservation Service, acting as USDA representative, to the Water Resources Council, to the appropriate river basin commission, to member agencies, and cooperating state(s) or federal agency.

## NOTIFICATIONS TO PLANNING CLEARINGHOUSES

Designated field offices of the Department will inform applicants for assistance of the need for them to notify the state and areawide planning and development clearinghouses of their intention to apply for assistance. Responsible field offices of the Department will establish working relations with the appropriate clearinghouses, notify the clearinghouses when the Department initiates planning activities, and provide for necessary consultation and coordination.









